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Our monthly selection of 25 MP3s from the best new Australian and international artists.

Full contents inside magazine

SUSE LINUX 9.2 for i386

The latest, complete version of this powerful Novell-backed Linux distro.

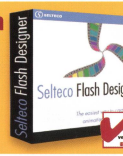
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New broadband

The faster, cheaper services set to supersede ADSL/Cable

Workshops

- Set up a network monitoring system
- Streamline Windows update across several PCs
- Turn your PDA into a remote control

Labs Challenges

Hard drives, sub-$2,000 PCs and image editing software tested



Security holes

Why security suites don't completely protect your PC

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Project Manager, *Department of Foreign Affairs, Switzerland*

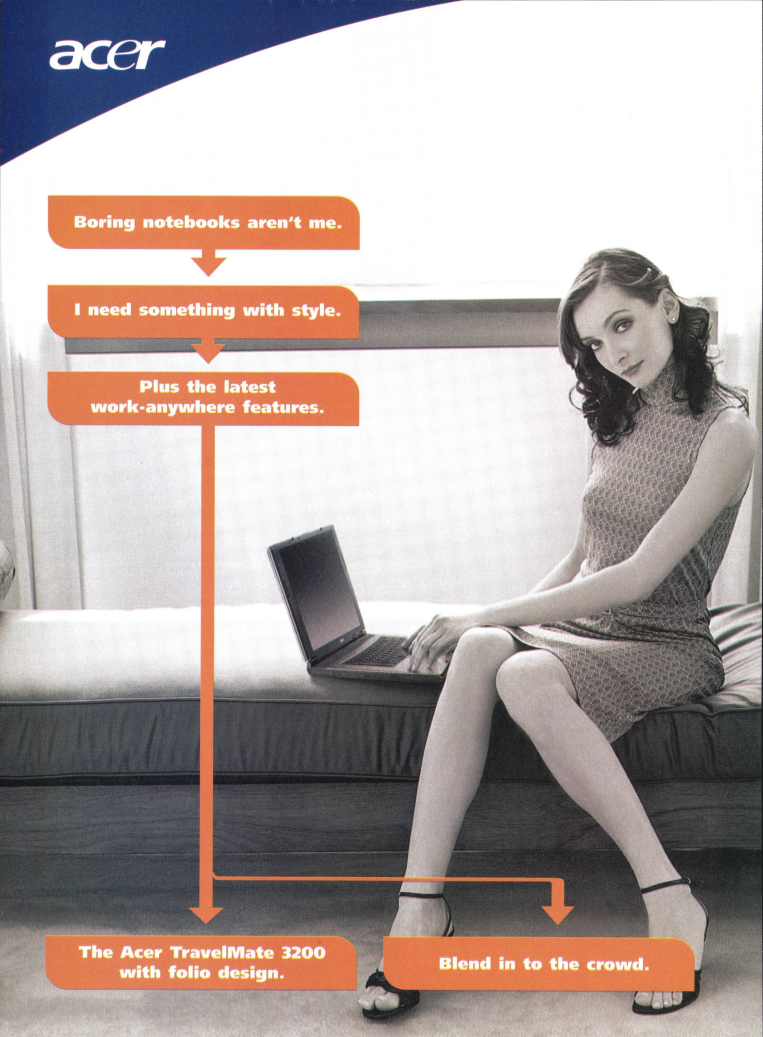
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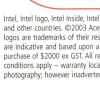
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I hadn't blown my paycheck at vegasbonanza.com

I'd realized how much webcambabe4U

I hadn't ordered my wife from bangkok-brides.com



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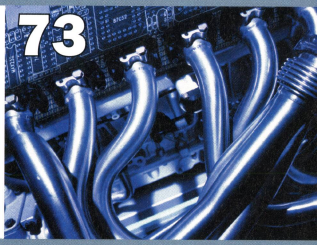
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System emulators mean never having to say goodbye to that beloved OS you cut your teeth on back in the '80s.

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Finally, speakers for the iPod that actually sound good. *Dan Warne* checks them out.



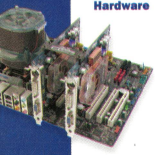




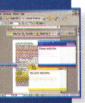
On Test

apc labs

Reviews



Hardware	Dell Axim X50v
	HP iPAQ h6365
	HP Business Inkjet 1200dtn
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	5GB Seagate Pocket Drive
	ASUS A8N-SLI Deluxe and N6600GT
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	Macromedia Captivate
	IEmulator 1.7.0
System	Optima WorkPro K8
	Acer Ferrari 3400LMi
	Dell Inspiron 9200
Best buy	All the top products in their fields





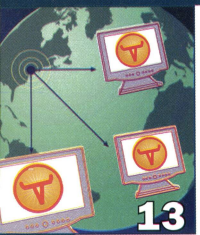


apc Labs Challenges

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	Photoshop for Digital Video
	and more
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	Lord of the Rings: The Battle for Middle-earth
	Men of Valor

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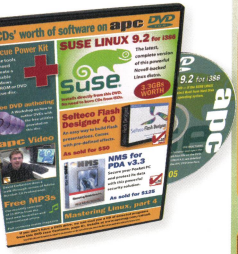
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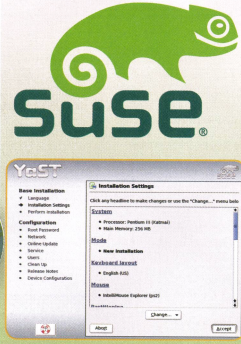
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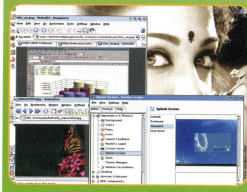
EXCLUSIVE

SUSE LINUX 9.2

3.3GBs WORTH







SUSE LINUX is one of the big three Linux distros, backed by networking giant Novell. This is version, 9.2, was released just as this issue went to press. You can install it directly from the DVD without having to burn ISO files to a CD first.

Version 9.2 includes an operating system and popular open source applications. Novell has made SUSE LINUX not just one of the most powerful Linux distros but also one of the most user-friendly. You can see this in the easy installation procedure.

The included raft of productivity, collaboration, connectivity and development programs provide alternatives to most of the major Windows apps. Version 9.2 also comes with enhanced networking and mobility with WLAN and Bluetooth support.

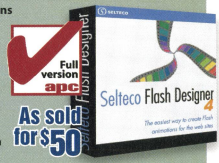
This eagerly awaited release of SUSE LINUX has been judged one of the best overall distros yet released by the Linux community.

The version on this DVD — known as the FTP version — is almost identical to Novell's commercial package. The only difference is that it doesn't come with manuals and official Novell support. However, as with most other distros, the SUSE LINUX community constitutes a more than an adequate helpdesk for this distro.

Note: this is a bootable disc. If you don't wish to install SUSE LINUX, *APC* advises that you remove the DVD from your computer after use. If you restart your computer without removing the *APC* disc first, click the Boot from Hard Disk option from the resulting menu to load your existing OS.

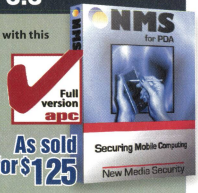
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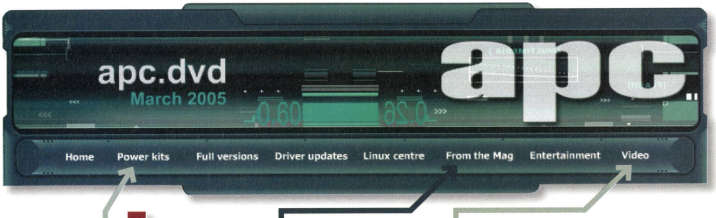
Build Flash presentations easily with this full-working version of Selteco Flash Designer 4. Animate images, text and shapes using 130 predefined animation effects, then add sound and music.



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Secure your Pocket PC PDA with this full-working version of the world's most powerful security solution for Pocket PC — from secure logins and data encryption to all-round PDA security. Plus free upgrade to Version 4.





Rescue Power Kit

By popular demand, a Rescue Power Kit which includes tools to get PCs up and running after a hardware or software disaster. Included is Bart's PE Builder, which allows you to create a bootable Windows CD-ROM or DVD from your original Windows XP or Windows Server 2003 installation/setup CD. A must for anyone who wants to create a superior rescue boot disc.

From the mag



Author and burn your own DVD with this selection of the best free DVD utilities, and a Workshop explaining how. Also included in "From the mag" are all the files referred to in the magazine's Workshop section.

Video



APC's resident software expert David Emberton takes you on a walk-through review of Adobe Acrobat 7.0 Professional. Although Acrobat is best known for PDF creation, the latest version can do a whole lot more.

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Short and sweet

We've made some changes to the magazine — the bleeding obvious one is that the editorial is now half the size. I've always thought editorials are too long, particularly after an entire *APC* editorial a few years back was devoted to giving me a pasting.

I have since forgiven the perpetrator, as he was reviving a tradition from the 1800s, when publishers used editorials to pillory competitors. Some of the cleverest insults ever penned were written by editors two centuries ago. However, today's defamation laws generally prevent that, so I'll base my editorials around the key information that will be of most use to you.

This issue, we've moved the Chip Chat and Downtime sections from the back of the magazine so they're in front of the advertising catalogues. This means that the Marketplace classifieds and Harris Technology advertising inserts are now together at the back. We've done this to aid navigation. The split is now cleaner, with all Workshop pages and the advertising catalogues together and easier to find.

Many readers have asked why we no longer supply CDs. In fact, we do. Request them at **www.apcmag.com/cdmail** and, if you're a subscriber, we'll send the CDs automatically.

The amount of software on the DVD has increased the support calls and emails we get. It's given us an insight into what software companies deal with. Even if we've tested a program on various computers before distributing it on our cover disc, there are so many computer setups that it may not work on every one. We cannot provide tech support; however, we do provide a support page (**www.apcmag.com/dvd**).

To be safe, *APC* readers should create a system restore point or back up key data on their machines before installing any software.

The SUSE LINUX 9.2 distribution highlights why *APC* needed to switch to DVDs. This beast is typically available only via a massive 3.3GB download. Yet on one bootable DVD, it's ready for you to install. A whole new world of big iron operating systems is now opened up to all.

Subscribe now for your chance to WIN!

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Check out page 65 for more details on how you could win this great prize.

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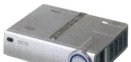
Data Projector
XJ-450



Compact package | 2800 ANSI lumens | True XGA support

- DLP™ system installed
- Compact package (278 × 64 × 197 mm, 2.4 kg)
- 2800 ANSI lumens high luminosity
- Wide-angle, variable-range 2X zoom
- Automatic vertical/horizontal keystone correction
- Auto focus

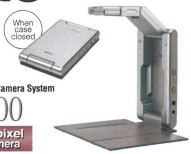
Data Projector
XJ-350



Ultra-Compact package | 2200 ANSI lumens | True XGA support

- DLP™ system installed
- Ultra-Compact package (230 × 55 × 171 mm, 1.8 kg)
- 2200 ANSI lumens high luminosity
- Wide-angle, variable-range 2X zoom
- Vertical/horizontal keystone correction

Multifunctional Camera System
YC-400



4-megapixel digital camera

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- Save, edit and replay of meeting materials and projection screen contents
- Image correction function for one-touch optimization of photographic images
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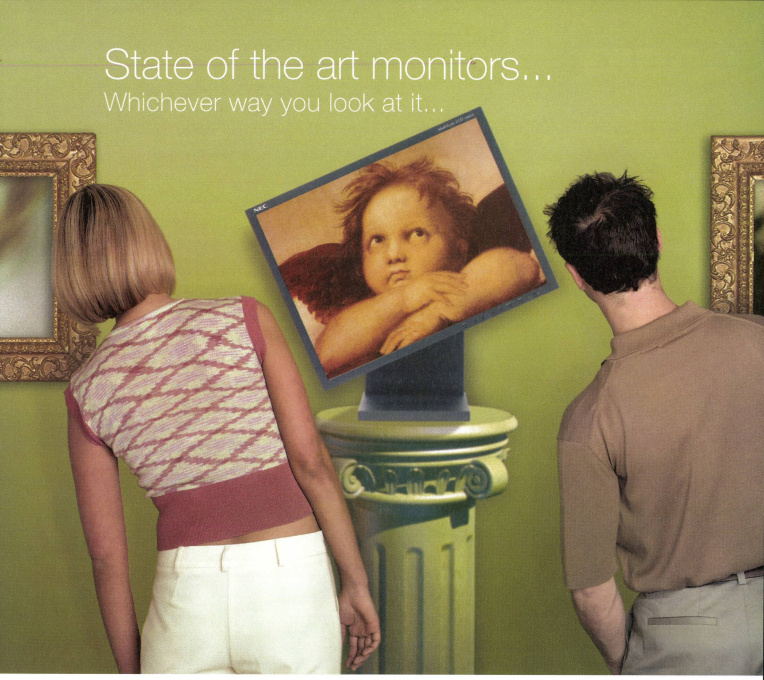
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Need to Know

News, views and analysis from the IT world

Pinpointing Longhorn users

A network of military satellites will be able to locate PCs using Microsoft's long-awaited OS anywhere in the world, reports *Dan Warne*.

Windows Watch

Windows XP's successor, codenamed Longhorn, will support global positioning (GPS) devices on an operating system level, making way for a generation of self-adjusting settings and programs that know where you are. The support will be a major boon for companies like Telstra's mapping and directory division, Sensis (**www.whereis.com.au**), which has vast stockpiles of data about the locations of Australian businesses, roads and transport, and can plot them on maps and lists of directions.

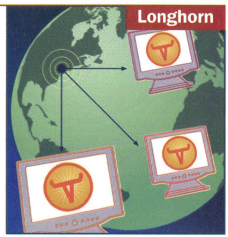
Longhorn users could open a Web browser, for instance, to find the nearest supermarket without having to type in their location. Microsoft is also proposing that the technology be used as a new way to sort and organise files. And, as reported in last month's issue (see *APC* February, page 13), Google's acquisition of satellite photography provider Keyhole means it will soon be able to offer photographic street directories.

There are many more possible uses. Digital camera manufacturers, competing vigorously on features, are expected to start adding GPS receivers to cameras so location information can be saved into JPEG files at the time photos are taken. The result would be digital photo browsing based on location and time rather than filename, which could help stop you accumulating thousands of similarly named digital photos on your hard drive.

Get ready for programs that know where you are

PC manufacturers are cautiously optimistic about the technology. Henry Lee, Optima's notebook product manager, said the company will look at implementing GPS into notebooks if the feature makes it into the shipping version of Windows and there's consumer demand for it. However, he said the cost of GPS receivers is still a problem, with pricing typically around $300.

This could drop with high-volume production, with Australian online retailer **www.efrontier.com.au** already selling USB GPS units for $80. Even chip giant Intel is ▶



No escape: *GPS-equipped operating systems, coming to a machine near you. Just don't ask when, exactly.*

Linux mobiles gain strength

Your next phone might be running Linux. A new Linux distribution, MontaVista, is designed to run on handheld devices and we're likely to see some models in 2005.

The most recent figures show that Linux is still running a distant fourth for handheld operating systems behind Windows CE, Palm OS and RIM, with just 0.9% of the market. But that may be about to change as PalmSource is rumoured to be considering dumping its proprietary OS in favour of a less costly Linux alternative.

Linux's open coding makes it easier to snap in or leave out components, which makes the OS perfect for memory-restricted portable



Linux phone: *DoCoMo's N900iI phone doesn't do Palm.*

Inside info

- MontaVista Linux

www.mvista.com

Also in Need to Know:

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Meet the head of security at Microsoft USA.

20 Feature Never say die
Old operating systems never die, writes *David Braue*, they just get emulated.

22 Feature Hype-jacking your wallet
Are you being ripped off by Internet security companies? *Jeanne-Vida Douglas* investigates.

26 Opinion
Dan Warne takes a look at open source VoIP application Skype — and doesn't like what he sees. *Mary Jo Foley* wonders who will fill the boots of the great Gates at Redmond if he does retire this year.

28 Watchdog
A reader has problems with the screen of his Apple PowerBook — and finds he's far from alone.

30 Epinions
APC readers have their say.

Is it legal...

. . . to mash it up?

"Mash-ups" — two songs merged together to create a single track — have been in the spotlight ever since US artist DJ Danger Mouse was directed to stop distributing his *Grey Album* mix of the Beatles' *White Album* with Jay-Z's *Black Album*. Now artists such as David Bowie are hoping to cash in on this phenomenon by promoting mash-ups of their own tracks. But are these creations legal?

In Australia and the United States, copyright in a musical work can be infringed by creating an adaptation of the original piece if the works are recognisably similar. Thus, music publishers or artists who control the licensing and copyright of the songs can determine whether to allow mash-ups or keep them underground and ultimately illegal.

Alan Crawford is a lawyer with Henry Davis York
alan_crawford@hdy.com.au

Disclaimer: *this does not constitute legal advice. Seek independent legal advice if an issue specifically concerns you.*

Processors

Intel readies "Desktrino"

Dual core will be the chipmaker's next big thing.

Intel's plans to exploit its Pentium M technology for forthcoming dual-core processor systems could result in home PCs that are both cooler and quieter, but also more expensive.

The chip giant is emphasising raw performance speeds less and examining mobile technologies as a basis for a dual-core design. Mobile dual-core processors are expected to evolve quickly, with president Paul Otellini predicting that 70% of mobile processors in 2006 will be dual core.

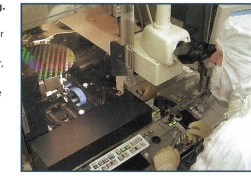
A desktop design based on those technologies could drastically reduce a PC's power needs. Some estimates suggest that a dual-core 2GHz Pentium based on mobile designs might consume a quarter of the wattage used by current Pentium 4 systems.

The new desktop processors will be backed by an elaborate platform marketing campaign, focused on desktop machines for the digital home. "Increasingly you'll see us add other features outside the microprocessor as well," Otellini noted at September 2004's Intel Developer Forum in San Francisco.

To score marketing funds for the campaign, PC builders will have to meet minimum specifications which could drive costs upwards on some models because vendors won't be able to offset processor expenditure with cheaper components elsewhere.

The earliest launch estimate is the second half of 2005, and Intel may wait for another Windows upgrade. Expect to be bombarded with publicity when the processors do appear, however.

Angus Kidman



Two for one: *dual core may mean cooler, quieter systems.*

Inside a "Desktrino" desktop

In return for its marketing muscle, early reports suggest that Intel may ask its partners to build desktop PCs using the following components:

- Dual-core processor based on Pentium M.
- Tri-band 802.11a/b/g wireless.
- Intel "Lakeport" supporting chipset.
- Intel 10/100 or Gigabit Ethernet.

▶ Pinpointing Longhorn users



considering adding location-based services to its Pentium M mobile computing chipsets, according to online reports.

While there is no suggestion that Microsoft plans to gather information on its users' whereabouts, Toshiba's product marketing director, Matt Codrington, believes that the wide availability of location data will raise major privacy concerns. "Serial numbers for processors were introduced a few years ago, and do you think a single one of those is switched on today?" he pointed out.

However, Codrington agreed that GPS has the potential to enable services that users will want, whereas processor serial numbers had no appeal to consumers. "Cars and phones will shortly get GPS," he concluded. "It won't be a big leap to integrate it into notebooks."

PC GPS: uses (and abuses?)

MAPPING & DIRECTIONS



Finding out how to get somewhere will get 50% easier — no more typing in your current address, just where you need to go. Companies like Sensis will then be able to give you maps and step by step directions.

LOCALISED SEARCHING



Got a sudden urge to buy a faster computer in order to run Longhorn? A search engine that knows your location would then be able to prioritise the results to guide you to the nearest computer shop.

AUTOMATIC COMPUTER SETTINGS



Tired of repeatedly switching your default printer between work and home, or selecting a different Wi-Fi connection each time? Windows could do it for you automatically if it knew where your PC was located.

FIND A FRIEND



Not as silly as it sounds. Windows could tell you exactly where your MSN Messenger contacts are. This is useful for locating colleagues or family, but privacy advocates are already lunging for their megaphones.

Wireless

Wi are we waiting?

While we're waiting for WiMAX, mesh networking may be the solution.

Until now, accessing a city-wide wireless broadband network meant lugging a proprietary wireless modem around with your notebook, or slotting in an ISP's specialised PCMCIA card. WiMAX promises to fix all that, with one standard for city-wide wireless networking built in to notebooks. The only problem is that the technology is still at least a couple of years off.

On paper at least, the specifications for WiMAX look sensational — coverage within a 50km radius of each base station, and speeds of up to 70Mbit/s. But notebooks aren't expected to have WiMAX incorporated until 2006/7. And even then, reception might not be great due to the limitations of inbuilt notebook antennae. In the meantime, millions of notebooks already support Wi-Fi, but users have been frustrated by expensive pricing and limited coverage.

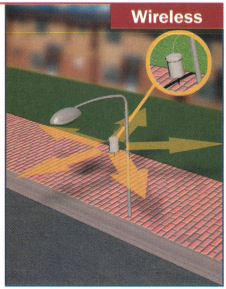
Mesh networking — access points that talk directly to each other to create a mesh of wireless coverage across a city — is emerging as one possible solution. And what makes it even more attractive is that it still allows users to connect using standard 802.11b.

Network hardware manufacturer Nortel has demonstrated to journalists its range of new mesh networking access points that allow a network to be created or expanded simply by hanging access points off street poles. Each access point then finds the nearest neighbour and talks to it directly.

It's the high-powered directional antennae built into the units that make this possible. Nortel has worked around Wi-Fi's relatively short range by incorporating five separate antennae pointing in all directions around the access point.

Ironically, the development of long-range WiMAX is pushing the concept of mesh networking close to the mainstream. Nortel's Danny Ng said the hardware could be adapted in the future to use WiMAX or another long-range networking protocol as the link used to create the mesh of coverage, while still allowing users to connect via standard 802.11b with no extra hardware required.

Dan Warne



Mesh networking: *access points on street poles talk directly to their closest neighbours, forming a network.*

Branded vs. Whitebox

How does an HP PC stack up against a whitebox PC of almost identical spec?

	HP/Compaq dx2000 MT	Cliae value Pentium 4 System
Source	www.hp.com.au	www.pc-supermarket.com
OS	XP Pro	XP Pro
CPU	Pentium 4 3GHz	Pentium 4 3GHz
Bus	800MHz FSB	800MHz FSB
Chipset	Intel 865GV	ASUS SiS 661FX
Case	Flexible Micro Tower Chassis	400W ATX MidiTower Chassis
RAM	256MB PC3200	256MB PC3200
Graphics	Integrated Intel Extreme Graphics 2	VGA SiS Real 256E Graphics
HDD	40GB 5,400rpm	80GB 7,200rpm
Optical drive	48x CD-RW	52x CD-RW
Monitor	None	None
Extras	One-year next business day onsite warranty	One-year RTB warranty; NERO Express and Trend Micro PC-cillin 2002
Price	$1,149	$956
The bottom line	Onsite service for the system and parts.	$193 cheaper, 40GB more storage, faster CD-RW, free software.

Whitebox

HP cracks whitebox market

The computing giant faces the fact that some people will never buy a branded PC.

Which "brand" sells more PCs than any other in Australia? Not one you know, and not strictly a brand, either. Unbranded or "whitebox" PCs from small manufacturers, system integrators and retail PC shops hold over 40% of the market.

The big brands covet this market share and can't understand why buyers don't appreciate that their trained service teams, brand-name components and quality-accredited manufacturing processes translate to better value.

Melbourne IT distributor Westan thinks it can bridge the gap. It recently signed a deal to sell whitebox PCs built by Hewlett-Packard — normal HP machines with parts HP uses in its branded PCs. Even the case will be an HP, minus the badge.

HP said the deal is about improving choice in the whitebox market, while Westan aims to make the whitebox market more respectable. "We have engineered a program to exceed any current whitebox experience," said Westan's national marketing director, Philip Jackson.

While whitebox makers don't welcome yet more competition, they are still confident. "HP PCs are just whiteboxes with a badge anyway," explained PC maker Emagen's David Kong.

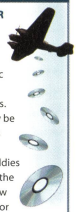
Simon Sharwood



Spot the diff: *why pay for the name?*

In brief news

NEXT-GEN DVD WAR



The battle of DVD formats has gone up another notch, with the 54GB Blu-ray Disc Association solving some technical issues. Blu-ray gear will now be compatible with CDs and DVDs thanks to dual laser heads. Caddies are also being given the bum's rush with a new version of TDK's Armor Plated scratchproof coating. Blu-ray's rival is HD DVD, which has lower capacity but is backed by Microsoft.

TRIPLE-SPEED BLUETOOTH

A new Bluetooth is on its way. Bluetooth 2.0 + EDR draws less power and can do 3Mbit/s. The Bluetooth Special Interest Group (SIG) also released a "roadmap" for the next few years outlining improvements in security, range and device interaction.



SOLARIS GOES OPEN SOURCE

Sun Microsystems is releasing the code for the x86 version of its server-grade Unix system, Solaris, for open source developers. Observers have questioned whether Sun can legally publish the code, but the company said it's working on the issues and it hopes the operating system will gain popularity through community development. The question is whether it will be released under the Linux-friendly GPL licence or one of Sun's own.

solaris™

Bigapixel camera

Extreme geek





Zooooooom: *parking officers will be crazed with the power.*

Delft University uses its MacGyver-like skills to jerry-rig a 2,490 megapixel camera.

What do you get when you mix five image processing and robotics gurus, photographic and robotics gear worth 8,500 (approx $14,250) and 160 hours of spare time? The world's largest panoramic digital image. The picture has 2.49 billion pixels (2,490 megapixels), enough to make your state-of-the-art D-SLR look like a happy snapper.

The secret? It's not an ultra high-res digital spy camera but rather the expertise of a team at TNO, the Dutch equivalent of the CSIRO, which used a 6 megapixel Nikon D1x digital SLR with 400mm zoom lens attached to a robotic controller. The 600 images were spliced using five 3GHz desktop PCs working non-stop for three days. TNO even had to develop its own format to support an image with so many pixels, since existing viewers go into a stupor trying to read images with even one-tenth of the resolution.

Pan, scan and zoom to your heart's content at **www.tno.nl/gigapix**. Let's just hope the technology doesn't come to music festivals, or the tradition of wagging school or work will come to a pixelated end!

David Braue

Where's Wally? *The world's first 2.5 billion pixel photo is kinda dull.*



Eye in the sky: *this is all getting a little too* Enemy of the State.

Images © TNO 2004, www.tno.nl/gigapix

Data dump

6,270

Number of computer seats open to participants in Sweden's Dreamhack during November 2004, claimed to be the world's largest LAN party. In a bid to encourage a "mixed" crowd, women were allowed in with cheap "visitor" tickets.

Number of Web pages in Google's index: **8 billion**	Previous number of pages in index: **4 billion**
(Source: News.com)	
Fall in desktop PC sales from second to third quarter, 2004: **10%**	Fall in notebook sales over same period: **8%**
(Source: CDN)	
Australian households with Internet access in 1998: **16%**	Households online in 2003: **53%**
(Source: Australian Bureau of Statistics)	
Percentage of PCs "knocked out" by software upgrade in UK Government department: **80%**	Number of employees in that department: **100,000**
(Source: ZDNet)	

Exchange: George Stathakopoulos

It's a dirty job and George has got to do it.

Interview



George Stathakopoulos is the Head of Security at Microsoft USA and the man in the hot seat whenever there's a new Internet virus emergency.

Do you move to DefCon3 when a major virus hits?
We use a colour scheme. "Code red" means a massive spread, massive amount of damage. "Emergency response" is a verb in Microsoft — I "emergency response" you. You then have certain things you have to go and do. In Central Command we have pretty much the whole company available to us. We can bring a thousand people in within an hour and talk to every staff member worldwide in less than six hours.

Most users run Windows in full admin mode, where viruses can easily get control of the system? Who's to blame for this?
There are a couple of things in Windows that we have done okay. Can we improve? Absolutely. In a simple user account in XP SP 2, you can do anything as an administrator by right-clicking on a program, selecting "Run As", then entering your username and password. Is this easy for a user to do? I don't think so. We're trying hard to make this right in Longhorn.

Do you plan to have a "Windows Update" for security rules in the same way that some firewall vendors offer managed firewalls?
We're definitely thinking about that space. What I can tell you about is something we call Active Protection Technologies — the ability of the system to make better decisions. Say your official mail client is set up as Outlook, then no other program would be allowed to send mail. We're looking into technologies like that which will be able to pre-emptively stop threats.

Is open source more secure than proprietary code?
[Laughs] Do you really want to go there? I'm very passionate about this. I believe that having formally trained people who are associated with and accountable for a line of code is a very good approach to making things secure.

But the RPC exploit has existed in the NT core code since 1995. Would it have survived for that long in open source?
There have been buffer overrun vulnerabilities that survived for many years across all operating systems. The fact that we missed this bug is a personal disappointment. We should have caught it.

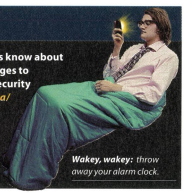
Do you ever feel that being Microsoft's security chief is an impossible job?
It's a hard job, but there are always solutions if you think laterally. Rather than trying to fix every specific instance of buffer overrun bug, for example, it's better to protect the whole system against buffer overruns occurring.

Are you talking about NX RAM in this instance?
Yes, but XP SP2 has something similar built into the software. One of the reasons the upgrade is so large is because we recompiled a lot of the components of Windows with this memory protection.

George Stathakopoulos spoke to Dan Warne

Windows Update by SMS

Never let it be said Microsoft doesn't do enough to let customers know about security flaws. The software giant will now send free SMS messages to customers who want to be informed immediately of the latest security updates. Registration at *http://members.microsoft.com/australia/technet/lounge/alerts/* just requires a free Microsoft Passport. We wonder how long it will be until pranksters start signing up friends and foes alike to Microsoft alerts that will no doubt see people stumbling out of bed at 3am after a big night on the town to relieve a pressing buffer overflow error.



***Wakey, wakey:** throw away your alarm clock.*

Decode:> Vibrating storage

What is it? **A way to dramatically speed up hard drive read/write times by having many drive heads reading data from vibrating storage platters.**

Should you care? **The idea has been championed by a company called Dataslide, which claims it reduces the performance gap between CPUs and hard drives. It's the last bottleneck, they say.**

***APC* verdict:** **Drive failures are bad enough without high-speed platter shake. The three-year-old press release on Dataslide's Web site makes us doubt we'll see the technology any time soon.**



Surfing (literally)

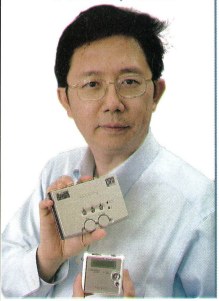
Okay, so Intel wants Centrino wireless to get you online anywhere, but now it's getting ridiculous. We're talking about the world's first Wi-Fi surfboard, a demo model complete with a screen built into a watertight plastic shell. You can even use it mid-wave, or so Intel would like to have us believe, judging by the press photo of a surfer straining to use the touchscreen. *Time* magazine named it one of the "Coolest Inventions" of 2004; we're more than happy to add another accolade to sit alongside it.

Want to nominate a dumbest moment in tech?
Send an email with the subject line Dumbest Moments to wmaher@apcmag.com. All correspondence becomes the property of *APC*.

Quote file

"The MP3 war has started and I am the one who has declared war"

Sim Wong Hoo, CEO of Creative Technology, announces that he's going to knock Apple's iPod off its pedestal.



Domain names

Dude, where's my domain?

Watch your domain name like a hawk because a new policy means others could snap it up.

A major change to domain transfer policies by global overseer ICANN (Internet Corporation for Assigned Names and Numbers) will now allow transfer of domains to a new party if the current registrar for the domain doesn't respond within five days of notification.

The new rule is targeted mainly at outlaw registrars who hold expired or desirable names for ransom, then play deaf and dumb when the owner demands the domains back. It should also resolve the problem of domain registrars that make it practically impossible to transfer a domain name to another registrar.

But what if you're away for a month's holidays and someone forges a Form of Authorization (FOA) to transfer your domain to them? Anyone could submit an FOA (newly introduced by ICANN to standardise transfer instructions) on your behalf, and if the registrar had no reason to block the transfer, your Web site could be down for days before the problem was discovered and put through ICANN's dispute resolution process. During that time, a spammer could use it as a base to spray millions of emails; even if you got the domain back, it could be blacklisted and its reputation destroyed.



Hands off: *don't let your domain out of your sight.*

Bruce Tonkin, chief technology officer with Australian domain provider Melbourne IT, believes the new system will be a big improvement. "We've often had situations where transfers have been denied for no reason and instances where other registrars have done transfers without getting proper approvals," Tonkin said. "The problem tends to be specific to particular registrars."

ICANN notes on its Web site that more than 10,000 domain disputes have been resolved through its formal dispute resolution process since its introduction in 1999, and the organisation seems confident that any spike in conflicts will be handled efficiently. To stave off trouble, be sure to lock your domains with your registrar and monitor upcoming domain expiration dates carefully. Exploitative registrars will pounce on expired domains first and answer questions later — usually for a big price tag.

David Braue

DREAM SYSTEM:>

Portable PlayStation2



Easy: *here's one I made earlier!*

Why get all excited about the PlayStation Portable when you could go one better and own a PlayStation2 Portable? All you need is a dial caliper, soldering iron, hot glue gun, laser etcher, diagramming skills, electronics expertise and about a week with nothing better to do. Then you can put yours together in just 864 easy steps.

When Ben Heckendorn pulled apart his PlayStation2, he had no idea what he was getting himself into. Now he's the only guy on his block — probably the only guy on his planet — with a portable PS2, complete with 5in LCD screen, built-in hard drive and DVD player.

"Last month I started working on this, realising it would probably be the most complex unit I've made yet," Heckendorn says on his Web site, **www.benheck.com**. "I was right, it took over a month. Due to the difficulty, it's the only one I'm going to build."

Heck now intends to write a book with the succinct title *Hacking video game consoles: Turn your old videogame systems into awesome new portables.*



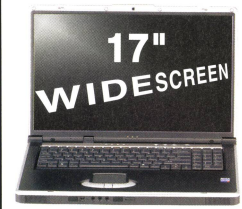
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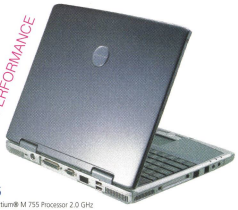


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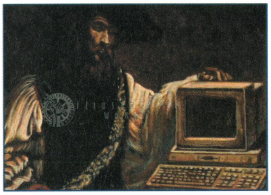
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Never say die

Are you keeping up with the Commodore? Because the Commodore is keeping up with you, writes *David Braue*.



Out of the dark ages: *there's life in the old dog yet.*

Anybody who grew up during the '80s will fondly remember names such as Commodore, Amiga, Apple, Timex-Sinclair, Atari and Tandy. While IBM and Compaq were trying to convince businesses that their bulky PCs would change the world, smaller PC makers were targeting home users with lighter machines designed to be fun and affordable.

Things we take for granted today — high resolution graphics, colour, the graphical user interface, high-speed disk drives, fluid animation, seamless multitasking, even the mouse — were pioneered on home PCs. Even now, nearly three decades after most of those systems appeared, enthusiasts are keeping many of them alive.

Chris Smolinski, a US programmer who develops Linux tools through his company, Black Cat Systems, got the bug after noticing that one of his early favourites, the Apple ///, was not yet represented in the emulator world. He decided to bring the platform back to life. "I saw lots of people had done Apple][emulators," he recalls. "How much harder could it be to write one for the Apple ///?"

He soon found out. Never a big seller, the system had been poorly documented, particularly when it came to hidden features. Smolinski also had to grasp at straws to figure out how the system talked with its 5MB hard drive, which he emulated as well.

None of it was easy, but the goal of making it work kept him going. "Even though I still actually had an Apple ///, it was difficult to get information about how it worked. I was very happy the first time it booted up with an Apple /// disk image, and I got it to the point where most applications seemed to be okay — but I could never get the BASIC working."

After nearly three years of on-and-off work, Smolinski finally put the wraps on Sara (Apple's initial codename for the ///). And it's not the only emulation: over time, somebody, somewhere has figured out how to emulate virtually every mass-market computer ever produced. (At press time, the dmoz open directory project linked to 457 different emulator projects at **http://dmoz.org/Computers/Emulators**.)

Many emulations are run by individual developers as a sort of ongoing mental challenge, while larger projects such as Wine and ReactOS (open source projects emulating the Windows application layer on Linux and other platforms), PearPC (which emulates the PowerPC chip to run Mac OS X under Windows) and AROS (a platform-independent port of the Amiga computer), are complex endeavours with dozens of contributors spread across the globe.

TWO WAYS TO EMULATE

There are two types of emulators: some emulate underlying hardware, and some approximate a computer's functions.

The former is easier to build, since techniques for running virtual computers within modern operating systems are well understood. Programmers write an application that duplicates the functionality of an old processor and complement it with code that emulates surrounding architecture such as internal clocks and timers, I/O techniques, specialised graphics chips and so on. Hardware specifications for these chips are usually well defined and available, and can be extended with modern features such as

RETROFIT YOUR PC



AMSTRAD CPC
Vintage 1984–1990
Specs CPU: Z80, 4.7MHz; RAM: 64/128KB; OS: AMSDOS or CP/M; Storage: cassette or (later) 360KB floppy.
Emulator WinAPE
Runs on Windows
Get it from *http://winape.emu unlim.com*



COMMODORE AMIGA
Vintage 1985–1992
Specs CPU: Motorola MC68000, 7.16MHz; RAM: 256KB; OS: AmigaOS; Graphics: 640 x 256 x 64 colours; Sound: 4-channel, 8-bit stereo; Storage: 880KB floppy.
Emulators UAE (requires ROM), AROS (open source).
Runs on Linux, DOS, Windows, MacOS, Mac OS X, RiscOS, BeOS, NextStep
Get it from *www.freiburg.linux.de/~uae; http://aros.sourceforge.net*



TIMEX SINCLAIR ZX80/81
Vintage 1980
Specs CPU: NEC 780C-1 at 3.25MHz; RAM: 1KB (expandable to 16KB); OS: N/A; Graphics: 64 x 48 x 2 colours; Sound: none; Storage: cassette.
Emulator z81 (requires ROM)
Runs on Various
Get it from *http://rus.members.beeb.net/z81.html*



APPLE II,][E,][C, IIGS
Vintage 1983–1993
Specs CPU: Motorola 6502 at 1.02MHz; RAM: 64KB; OS: ProDOS; Graphics: 560 x 192 x 2 or 140 x 192 x 16; Storage: 800KB 5.25in disk.
Emulators Appalm][(IIe for Palm); KEGS32 (IIgs for Windows); Apple II Oasis (IIe for Windows).
Get it from Apple II Oasis: *www.geocities.com/apl24win/index.html*; KEGS32: *www.geocities.com/akilgard/kegs32*; Appalm][: *http://palmapple.sourceforge.net*

Bluetooth and USB capabilities by combining the old code with new code.

The mark of success for a hardware emulator is when an old operating system will load onto the software platform none the wiser. However, many applications may require further tweaks since programs are notorious for using undocumented features.

Because programs using this technique are emulating the underlying processor, they may run several operating systems. For example, Mac-On-Linux (**www.maconlinux.net**), which emulates a Motorola 68k series computer, will run both Mac OS and PowerPC-optimised operating systems like Yellow Dog Linux. "I was curious to know if it would work, and once it did I had to do it completely," says Samuel Rydh, the Swedish developer behind Mac-On-Linux. "It was fun, and it will never be quite finished."

The other type of emulator, a software-only solution, is more difficult because it not only has to support a foreign operating system but translate its calls to equivalent instructions on the underlying hardware. This has made Wine, the most high-profile open source emulator, a massive project as developers try to replicate the thousands of application programming interfaces (APIs) around which Windows applications are built.

Since the developers of software-only emulators are working from the outside, emulation is usually imperfect… and always time-consuming. Sometimes, it doesn't even work. It is, however, educational and often personally satisfying. "I learned more about the Commodore 64 writing my emulator than I did in all the years I'd actually been programming the C64," says Christian Bauer, a German PhD student in physics whose emulators to date include Frodo (for C64), Basilisk (which emulates the Macintosh Classic on an Amiga PC), and ShapeShifter (a multi-platform Motorola 68k emulator that's been wildly successful).

BRING ME BACK TO LIFE

Emulators are often the manifestation of a larger community that refuses to let its favourite device fall into disuse. One such enthusiast is Paul Guyot, a PhD student in artificial intelligence at French institute LIP6. Guyot discovered Apple's now defunct Newton MessagePad US MP2000 in 1997 and recently began developing Einstein, an emulator he hopes will let the Newton OS run on other PDAs and desktops.

Apple killed off the device years ago, but a large online community has continued to support and expand it with features such as Wi-Fi, Bluetooth and USB. "People didn't just buy the Newton because it was the latest gadget," says Guyot. "They bought it because they were astonished by its capabilities."

Guyot's first step was to build a virtual version of the Newton hardware platform. "Making an image of the Newton platform allows us to understand how the OS works," says Guyot, who's currently working through emulating low-level components such as the Newton's real-time clock.

Working at this low level often reveals the secrets behind system designs. For example, Guyot's work exposed what he thought was a bug: the CPU often tried to access parts of the RAM that weren't available to it. After four days of poking and prodding, Guyot realised the design was intentional, a clever way of getting around limitations in the amount of accessible system RAM.

Though there's every chance that Einstein won't be released to the general public, its lessons are proving valuable. Old PCs may never fetch as much as a bottle of Grange, but developers who still have affection for their once-favoured computers are rescuing them from the dustbin of IT history. EOTE

Is it legal?

Emulator authors generally focus on emulating a specific CPU and related chips and leave it up to users to load their own copy of the system's read-only memory, ostensibly copied under backup provisions in copyright law. ROMs are easy to locate online and most users copy them, which is a clear breach of copyright.

However, emulator developers argue that they haven't lifted code themselves. Emulators such as Wine, which don't emulate CPUs but simply provide their own versions of compatible APIs, are legally separate products. If it came to the crunch, hardware makers could assert that emulators break any number of patents on the way their systems work.

Disclaimer: this does not constitute legal advice. Seek independent legal advice if an issue is of particular concern to you.



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Emulator TRS-80 Color Computer Emulator.
Runs on Windows
Get it from *http://discover-net.net/~dmkeil/coco*



COMMODORE 64
Vintage 1982
Features CPU: 6510A at 1.02MHz; RAM: 64KB; OS: BASIC 2.0; Graphics: 320 x 200 x 16; Sound: 3-voice; Storage: cassette or disk.
Emulator CCS64
Runs on Windows
Get it from *www.computerbrains.com/ccs64*



ATARI 520 ST
Vintage 1985
Features CPU: Motorola 68000 at 8MHz; RAM: 512KB; OS: Tramiel Operating System (TOS); Graphics: 640 x 400 x 2, 640 x 200 x 4, 320 x 200 x 16; Sound: Built-in MIDI port; Storage: floppy.
Emulators STonX, STeem
Runs on Windows, Linux/Unix, DOS
Get it from *http://steem.atari.st; http://stonx.sourceforge.net;*

Mac on PC

PearPC (**http://pearpc.sourceforge.net**) is an emulator for the Macintosh's PowerPC CPU that runs on Intel x86-based systems. PearPC allows x86-based Windows PCs to run traditionally Macintosh-based operating systems, including Mandrake Linux 9.1 for PPC, Darwin (the open source core of Mac OS X), Mac OS X 10.3, OpenBSD for PPC, NetBSD for PPC and AIX for PPC.

You'll need a legal copy of Mac OS X. An emulated version of a complex CPU like the PowerPC invariably runs more slowly than the real thing, but so far the feedback is promising.



Hype-jacking your wallet

Are you being ripped off by Internet security companies?

***Jeanne-Vida Douglas* investigates.**

Revealing that you've been infected with a computer virus, Trojan horse or spyware is almost like admitting to having a venereal disease. It's the classic blame-the-victim scenario. While everyone smiles and wishes you a speedy recovery, inside they're thinking: "I know what sort of Web sites *you've* been visiting." Or perhaps: "That's what you get when you don't update your software."

But the simple fact is that even PCs with the latest antivirus, antispam, anti-spyware and firewall software are subject to infection, as Jamie Nguyen of Sydney discovered late last year. According to Nguyen, his Symantec antivirus software was up-to-date and his McAfee firewall fully operational when his computer spontaneously attempted to connect to an IRC channel. "I work in the IT security field so I spotted it straight away," Nguyen says. "I'd downloaded software from the Internet, and it seemed like a legitimate program, but the Trojan came in with it. It was a bit embarrassing really."

Nguyen believes the incident serves to hammer home the fact that even the most conscientious computer users are vulnerable, and says it's not the antivirus software providers who are at fault.

"When it comes to the quality of antivirus and security software," Ngyuen says, "it is much of a muchness. They are all quick at getting the virus signatures out there, but there's only so much they can do."

Inside info

- Smartcards
  www.smartcardforum.asn.au
- Biometrics
  www.biometricsinstitute.org

PERFECT PACKAGES?

Others are less understanding. Rich Mogull, research director for IT business analyst group Gartner, wants consumers to rise up against security software vendors and demand their rights. He's even called for legislative changes to target antivirus vendors whose products don't live up to their claims.

"There is still so much confusion out there," says Mogull. "End users don't understand why they have to see so many alerts, and whether or not they represent a serious threat or something more benign. They don't understand why they need five different types of software to do one job, and they don't understand why they have to pay US$50–$70 every year to make sure the software they bought actually works."

However, product consolidation doesn't always result in a better deal for customers, according to Georgina Swan, editor of *Computer Choice* magazine. "There is a bit of a trade-off with the suites that are currently available," Swan believes. "While one suite may have antivirus which works well, its spyware remover may not be much good, or it may feature a firewall that isn't very secure."

Given that a typical home user might now have antivirus, anti-spyware, firewall, file encryption and antispam software to deal with as a minimum, the option of a software suite with a single interface and a single update mechanism is certainly appealing. However, unwary customers may find themselves having to buy extra products to plug holes in such a suite.

Part of the problem, Swan believes, is that antivirus and security software have proved to be a "good little earner", attracting a lot of players with questionable credentials. "There is a considerable amount of money spent on marketing antivirus software and security suites as a cure-all, and that's just not the case." However, Swan also points out that it's not the vendor's capacity to track and identify a virus that's the major cause for concern, but the nature of the software and the level of support it provides.

SECURITY VERSUS SIMPLICITY

Here's the rub: it doesn't matter whether you opt for a suite of software, an integrated software package, or mix and match your own protection through your local reseller — no software security vendor can guarantee its products will fully protect your system. And while security software vendors recognise that consumers are running out of patience with an industry that seems to offer way more than it can actually deliver, they aren't about to offer easy answers.

According to John Richmond, senior technical consultant for Sophos Australia /New Zealand, the main reason Internet security seems to work better for corporate customers than it does for home users is product implementation. "Consumers want their computers to run like their cars; they don't want to know what happens under ▶

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▶ the bonnet to drive," says Richmond. "They want to install the software once and know their system is safe after that. The corporate market is easier because there are IT teams whose job it is to make sure the protection is correctly configured and up-to-date."

Like many antivirus software vendors, Richmond believes the key to improving consumer protection lies in auto-updating techniques and customer support. Meanwhile, the security software industry seems to have decided that as it can't make its products 100% effective, it should make them as painless to use as possible. Georgina Swan says that the focus of her research has changed accordingly. "When we tested antivirus products in the past, we used to focus on performance in terms of identifying threats and providing virus signatures. Now we focus more on ease of use and support."

Don't get embarrassed, get angry

SWEET FREEWARE SUITES

But before you resign yourself to a costly but ineffective "solution", remember there are alternatives to spending a lot of money on a product you can't entirely trust. According to Jason Edelstein, principal consultant for corporate IT security providers Sense of Security, you can assemble a "suite" of free programs which combine to provide similar levels of protection to their commercial counterparts. "There's lots of free stuff, especially if you're happy to use Linux. You can also take advantage of the basic security mechanisms that came into effect with Windows XP Service Pack 2."

However well you research your security purchases (or downloads), you'll still be faced with a "damned if you do and damned if you don't" dilemma. While security software vendors can't provide watertight guarantees, their products give you essential protection against known threats, and are increasingly indispensable.

Nonetheless, a considerable amount of consumer pressure is needed to keep vendors on their toes when it comes to providing service and support. So don't get embarrassed if an apparently protected machine gets infected, get angry! Whether through poor support or poorly designed software, your security vendor deserves to accept at least some of the blame. ETLC

Top 5 hype-jack targets

How security companies will try to spook you into spending more money in the next 12 months:

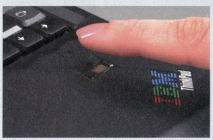
- **Physical security:** your LAN access is your security pass. Forget it and you'll be locked out of every door as well as your PC!
- **Fingerprint readers:** integrated units and USB plug-ins are set to replace passwords in some corporate environments.
- **Authentication tokens:** portable password tokens which provide double authentication for banking sites are under consideration, but who will pay for them?
- **Secure desktop search:** the flexibility of free tools such as Google Desktop Search without the risk of viruses using them to search your hard drive.
- **VoIP security:** will recordings of your most intimate Internet phone calls turn up on file-sharing networks?

Microsoft dumps passwords

Last year, Bill Gates announced plans to improve security for Microsoft's corporate network using Axalto's Cryptoflex .NET-powered smartcard. This is no small task given that the Microsoft corporate network comprises 61,000 employees spread over 400 locations and 175 remote network access points worldwide. The Axalto system requires employees to have a card and provide a PIN to access the network.

The announcement must have come as a relief to Microsoft employees, who are currently required to periodically generate 15-digit passwords comprising complex alphanumeric and symbol combinations. Among the alternatives considered were password-generating tokens, which were judged too expensive, and biometric scanners, which were too unreliable.

Microsoft's mooted system is based on Windows 2000 Server and Windows Server 2003, Active Directory, Windows-based Public Key Infrastructure (PKI) and Certificate Authority (CA), Windows for Smart Cards and the Axalto smartcards.





Open sesame: *expect to see more hardware with integrated biometric and smartcard scanning.*

Unlike magnetic strip technology, the Axalto smartcards contain their own operating systems which prevent sensitive information being accessed, changed or copied. Costed at between US$3.5 and US$4.5 million for the entire Microsoft network, the smartcard approach also represents an affordable security upgrade. And while it rejected a biometrics-based approach to its own security, Microsoft will continue to support built-in and USB fingerprint scanners such as those now integrated into IBM's ThinkPad T42.

As a result, consumers can expect to see a rapid rise in hardware featuring integrated smartcard and biometric scanning technology over the next few years. However, Dr Ted Dunstone, chief executive officer of biometric security technology provider Biometix, warns against excessive enthusiasm for any new security measures. "There is always the danger that people will introduce features perceived to be more secure," he says, "but which also introduce simple vulnerabilities which render the whole system useless."

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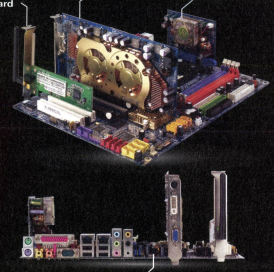
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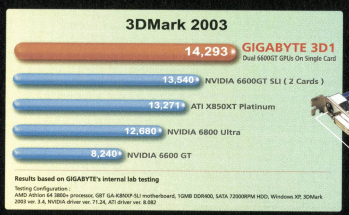
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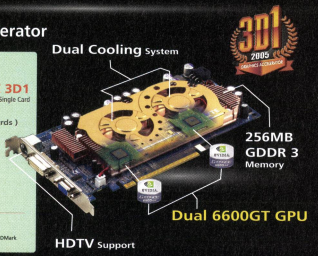
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Don't believe the Skype

Skype is just another case of a technology "innovator" trying to reinvent an open standard for profit, says *Dan Warne*.

Anyone remember when Apple tried to create a custom Internet called "eWorld" in the 1990s, hoping to sign people up to a paid service before they wised up to the free alternative? Or when Microsoft tried to co-opt Sun's Java technology by producing custom extensions that weren't compatible with the original Sun standard, thus forcing everyone to use the Windows-only Microsoft Java Virtual Machine for compatibility? Skype is just the latest example of a wise-ass player trying to suck consumers into a proprietary version of something that already exists for free.

Proprietary versions of open standards are lame

Skype is a Voice over IP application and its maker, Nicholas Zennstrom, was the original brain behind the file-sharing client Kazaa. Now, in a convenient deal, Skype has been bundled with Kazaa 3.0. At the time of writing, 39 million people had downloaded the standalone Skype program, making it by far the most popular VoIP application.

"So what?" you may ask. "It's all good, nobody's forcing anyone to use Skype, and it's free!" Indeed, the software download is free. Calling other Skype users is free. But there's a catch. The real beauty of modern Voice over IP technology is using a VoIP provider to connect your VoIP calls to regular (non-VoIP) phone numbers. This is where you can make big cost savings if you shop around for a provider.

Skype has embraced this approach with open arms. It offers a huge selection of providers, like SkypeOut, SkypeOut and, ahh, SkypeOut. This service is owned and operated by Skype and Sons, and the company confirmed in an email to *APC* that it has no plans to open the platform to any other provider.

Sadly, the open-standard competitor, Session Initiation Protocol (SIP), has a dorky name and isn't integrated with Kazaa. It is also a little trickier to use because software and hardware based on the standard generally needs some basic configuration (they're rarely locked to a single provider).

On the other hand, SIP does have the massive advantage of allowing any combination of hardware, software and provider to make calls. This is where competition comes into play — with many different providers jostling for business, prices inevitably come down.

Meanwhile, if you've already signed up with SkypeOut and bought a block of calling credits, you can wave goodbye to that money if you decide you'd like to change to a SIP provider: "Skype does not offer refunds," its FAQ page states.

It gets worse. If you don't use your account for six months, Skype will help itself to your money. Any excess credit will be zeroed. That's pure profit for Skype.

Skype is working to lock users into its proprietary system and has signed up hardware giant Siemens to make VoIP phone adaptors that only work with Skype. No doubt Siemens will cash in on the brand and push it through mum-and-dad electronics retailers. It may be some way down the track before new users realise they can't use any other provider but Skype. Ka-ching!

Proprietary versions of open standards are lame. They inhibit competition and keep prices artificially high. Skype is just the latest in a long procession of greedy companies trying to sell ice to Eskimos. Don't fall for it.

Searching for Gates 2.0

Who will fill the boots of the great Gates if he retires this year?

Mary Jo Foley



Windows Watch

Bill Gates said not so long ago that he'd like to retire at 50. If he sticks to it, he'll be accepting the gold watch and carpet slippers some time in 2005.

We're not expecting Gates to hang up either his chairman or his chief software architect hats this year. But his growing interest in the Bill and Melinda Gates Foundation — not to mention biotech stocks, bridge and his two children — means it's only a matter of time before Bill moves on.

So who will be Gates' successor? Many have speculated that he'll hand-pick the next Microsoft leader from within the existing Redmond rank-and-file. But given the ages of some of his colleagues — CEO Steve Ballmer (48), Platform VP Jim Allchin (52) and Information Worker chief Jeff Raikes (46) — we're not inclined to believe this.

Perhaps Gates will look, instead, to some of Microsoft's rising upstarts? Could it be the boyish Server and Tools VP, Eric Rudder (37)? What about J Allard, the 35-year-old Xbox chief? Or maybe Yusuf Mehdi (38), a fast-rising MSN star who cut his teeth on Windows in the mid-'90s? None of these guys seems top leadership material to me.

What about bringing an outsider in? Microsoft has tried this tactic a couple of times. Ex-Procter & Gamble man Bob Herbold remained an outsider throughout his tenure as Microsoft's chief operating officer. IBM transplants like Michael Sinneck didn't last long, either.

The problem is that there won't be another Gates. Microsoft thrives on the cult of Bill. Folks there talk like Gates, walk like Gates, rock like Gates. His temper tantrums and brainstorms are equally the stuff of legend. Who else can inspire the 57,000-plus employees in the same way? No-one. Gates's shoes cannot be filled by any one individual.

So what's likely to happen once Gates decides he's had enough? My bet? Microsoft won't be headed by a single individual but will be run by a team — something akin to the Business Leadership Team that currently advises Gates. Sure, leadership by committee isn't easy. But neither is running a company as complex as Microsoft. Then again, without strong leaders tech companies tend to quickly flounder; look at what happened to Apple before the resurrection of Steve Jobs.

Am I off my Microsoft Watch perch? Time will tell. Check back in another decade, or whenever Gates decides to move on, whichever comes first.

*Mary Jo Foley is Editor of Microsoft Watch (**www.microsoft-watch.com**). She sounds off exclusively for* APC *on Windows each month.*

ASUS DVD Burners enable 16X Burning with 8X Discs

Although DVD burning technology has progressed to 16X, the supply of disc media supporting this new high-speed standard remains low. Even if you are one of the lucky few that is in possession of these expensive discs, you still have to worry about burning reliability unless you want a stack of overpriced coasters.

Optical drive makers, of course, won't let their technological advancements go to waste. Take ASUS for example, the company introduced an innovative feature called "Over-Speed Burning". This feature enables users to enjoy fast 16X burning with 8X discs, which are more readily available and more affordable. It's a cost-effective way to shorten burning time.

Double burning speed on dual-layer disks

Over-Speed Burning also supports double-layer discs, which offer large data capacity up to 8.5GB, roughly 2,000 MP3 songs. Most double-layer discs at the moment support 2.4X speed, meaning to burn a full disc takes approximately 40 to 50 minutes. 4X discs are available as well, but higher speed also comes with higher price. With Over-Speed Burning, you can burn an 8.5GB, 2.4X double-layer disc in only 26 minutes.

Disc quality detection for best burning speed

The advantages of Over-Speed Burning are pretty obvious. The one thing you need to pay special attention to is disc quality. Please make sure you purchase discs approved by the manufacturer of your drive. ASUS implement a mechanism for disc quality detection and intelligently adjust for the most suitable burning speeds to prevent poor quality and damaged discs.



In conclusion, if you know what to look for, enjoying the fastest burning speed doesn't necessarily have to mean emptying your wallet. DVD burners with Over Speed Burning are excellent solutions as the shortage of 16X and 4X dual-layer discs continue and these discs remain expensive.

Double layer burning comparison

Disc media	Burning speed	Burning time	Good	Bad
2.4X	2.4X	40-50 min	· Disc is easily attainable · Affordable	Long burning time
4X	4X	26 min	· Short burning time	Supply is low Very expensive
2.4X	Over Speed at 4X	26 min	· Disc is easily attainable · Affordable · Short burning time	High-quality discs needed

The Choice of Expert Gamers

ASUS Gamer Edition Cards Deliver Big Bang for the Buck

The launch of new titles such as Lineage II and Doom 3 should propel a wave of system upgrades among serious gamers, since more powerful video performance is needed to smoothly run the latest 3D games. Taking into account that many gamers probably don't have huge budgets to enhance their gaming systems, ASUS, a leading provider of graphics solutions, recently introduced special Gamer Edition video cards, which offer explosive graphics at affordable prices.



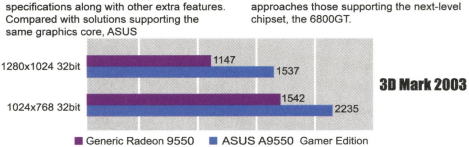
Improved circuitry and memory modules

Gamer Edition cards, as the name suggests, are specifically tailored towards keen gamers. Gamer Edition cards have redesigned circuit boards, upgraded memory specifications along with other extra features. Compared with solutions supporting the same graphics core, ASUS Gamer Edition cards deliver superior video performance.

For example, the ASUS A9550 Gamer Edition (supporting ATI's Radeon 9550 chipset) provides a 25% performance increase compared with typical Radeon 9550-based graphics cards. And the ASUS V9250 Gamer Edition (supporting Nvidia's FX5200 chipset) is 50% more powerful than other FX5200 solutions.

Same performance using lower-end graphics core

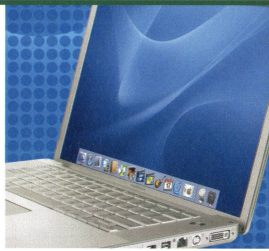
It takes strong engineering to be able to redesign the reference card. The ASUS V9999 Gamer Edition runs on Nvidia's 6800 chipset, but the card's performance actually approaches those supporting the next-level chipset, the 6800GT.



With higher-end memory, the prices of Gamer Edition cards are slightly higher than solutions using the same graphics core, but enable far better video capability. ASUS Gamer Edition is currently the choice of many gaming experts and users who demand top-of-the-line visual effects. Give a little more and you'll get back so much more.

Curse of the spotty Apple

A reader has trouble with his Apple PowerBook screen — and finds he's far from alone.



Pixel problems: *one bad Apple can spoil the barrel...*

Dear Watchdog,
In March 2004, I purchased a 15in Apple PowerBook. To my disappointment, by June its illumination was noticeably uneven. I gave it to an Apple Service Centre, who replaced the LCD panel. Soon the problem recurred and the LCD display was again replaced.

In August, to my frustration, it happened again, so I put it in for repair with a different centre, who found it to be "within spec". It was sent to Apple's Australian headquarters, who also asserted there was nothing wrong with it.

In October, pixel defects also appeared. Apple looked at the PowerBook again but restated that the panel was "within spec". They did say a magnet was left out during the last repair, which had now been replaced.

I work in the technical pre-press area of the graphics arts industry, so spots and variations are difficult to ignore. I don't think I'm being overly picky though.

It seems like I'm not alone. Apple's own support discussion forum has in excess of 1,100 entries referencing "uneven display" issues globally with this model of PowerBook. There are even online petitions to Apple for some definite fix to be enacted.

How can I get an independent assessment of the LCD display on my PowerBook to contest Apple's claim that it's faultless?

Charles Waye
Engadine, NSW

As with all Watchdog complaints, *APC* first gave Apple the opportunity to investigate and resolve the issue directly. Apple's head of public relations, Martha Raupp, responded that she would be happy for *APC* to assess the notebook as an independent party.

When Charles brought it in to *APC* Labs, we measured the locations of the seven stuck pixels and listed their coordinates for Apple's repair technicians. We also compared Charles' PowerBook to the same model owned by a staff member. That PowerBook had noticeably better and more even illumination.

Watchdog provided Apple with its report, along with Charles' notebook. The company conceded that the display had faults and that the number of them was unacceptable, and agreed to replace the panel. We also invited Apple to comment on why the faults hadn't been picked up,

Colour cartridge conundrum

Dear Watchdog,
I purchased an Epson C900 colour laser printer from a local office equipment store around six months ago to print flyers for my business. Apart from a few test pages, my only decent print run was a month ago.

Before I had even finished a ream of A4 paper (500 sheets), I successively ran out of each of the colour toner cartridges. Upon returning to the place of purchase, I found that each toner cartridge cost $280. Considering that I'd paid $900 for the printer, I was a bit shocked. To add insult to injury, Epson was now only charging $600 for the same printer.

When I called Epson to complain about the short toner life I was told that the printers were sold with half the toner in the cartridge to keep costs down. Now I find out that my printer can't be sold for a reasonable price because Epson has devalued the printer.

I have seriously considered throwing it out because of its sky-high running costs, which I thought were the domain of sub-$200 printers. I subsequently finished my printing job at the office supply store, electing to use up their toner. The Epson sits gathering dust in my office.

Yee Han Chaung
Doncaster East, Vic



$1,120 for a bunch of printouts: *whaddya mean, that's not reasonable?*

Dear Watchdog,
Most laser printer vendors provide starter cartridges with new printers. The C900 brochure and the Epson Web site state clearly that the C900 starter cartridges will print 1,500 pages at the industry standard of 5% page coverage per colour, including black.

Laser printer operating costs should include not just cartridges but also a replacement drum at $253. Replacement cartridges cost $108.90 for black and $247.50 for each of the three colours. The set of four cartridges prints 4,500 pages at 5% coverage per cartridge — 20% coverage in total. In colour printing mode the drum should be replaced after 11,250 pages and after 45,000 pages in mono mode.

Based on this, the C900 cost per page for printing 11,250 colour copies at 5% coverage per cartridge compares favourably with Epson's competitors and is much lower than commercial colour copying costs.

Your readers will also have noted that in recent months the prices of many laser printers have fallen, driven by competition and improvements in technology.

Mike Pleasants
director of marketing communications
Epson

but Raupp was no longer returning Watchdog's calls.

Charles is relieved that the notebook is finally working. "Since powering it up last night and using it for several hours, everything is looking good. The illumination is very even across the display." But he was disappointed with how difficult it was to get it fixed.

Have you had problems with Apple service? Report them to watchdog@apcmag.com.

BURNED BY A POWER SPIKE

I purchased a PC from Plus Corp in November 2003 and until now have been extremely happy with their service. I wouldn't have hesitated in recommending them. However, in November 2004, I found that the two SATA drives were no longer accessible and the RAID controller was reporting no drives connected. As I'd paid for an upgrade to a three-year onsite warranty I called Warranty Assist Australia. The next day I was contacted by one of their contractors to arrange a service call.

When the technician arrived, he decided the problem couldn't be fixed on the spot and took the PC away. He later got in touch and informed me that both the drives and the RAID controller on the motherboard appeared to be dead and he would be requesting replacements.

I then received a call from the warranty provider stating that the PC wouldn't be covered under warranty as the problem was caused by a power surge. I expressed my unhappiness and was put through to a manager, who restated the position that the power surge was caused by a device plugged into one of the front USB ports on the PC.

I haven't actually used the front USB ports since buying the PC. I tried them and found they weren't working, so I assumed they weren't connected or supported on this PC and thought no more about it.

When I asked how the manager knew which component had caused the power surge he stated that any power surge was not covered by the warranty, even if it was caused by one of the components that came with the PC! I am now left with a PC that needs a new motherboard and two new hard drives, and a worthless warranty upgrade.

Can you confirm that WAA can void my warranty due to a power surge, even if it is caused by a faulty component on the PC?

Mat Ward
Richmond, Vic

Watchdog asked Warranty Assist Australia for proof that the PC had suffered a power surge and details of its policy exclusion.

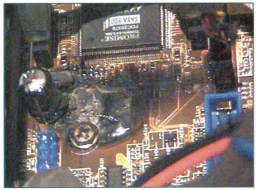
Spokesman David Holt supplied the warranty wording, which did list exclusions including power surges. He also supplied photographs of the motherboard (shown) to show the melted area.

Warranty Assist Australia said most insurers don't cover power surges because they are so frequent. Most home insurers now offer power-spike coverage as an option on home contents insurance.

Mat concedes that a power spike must have occurred because the ports at the front of the machine, cable leading to the motherboard and a section of the motherboard itself have melted. But he disputes that it is his fault, as he hasn't used the USB ports. He suspects a faulty component and argues that this should be covered by warranty.

To compound his annoyance, Mat received a bill for $143 from WAA's contract repairer for the onsite visit. "Considering I've purchased onsite support, I'd at least expect the determination of a problems onsite to be covered," he said.

Following Watchdog's enquiries, Plus Corp Managing Director Nigel Fernandes said he would replace the motherboard and hard drives as a gesture of goodwill, and Warranty Assist Australia said it would cover the $143 bill. However, AWA's David Holt said because the claim was power surge-related, onsite assessment would not normally be covered under the standard terms of the extended warranty.



Meltdown: *the melted area, caused by a power surge, is affecting the Promise RAID controller nearby.*

Getting ADSL? Oh, the pain!

Ross McLeod of Caloundra, Qld, can't get reliable dialup, let alone broadband, and is forced to use expensive and relatively slow ISDN to get reliable Internet at home. But when ADSL became available in his area, he thought he'd apply for it. That's when the trouble began.

Telstra's online availability checker indicated that ADSL was available on his phone line, but when he applied he was turned away because his ISDN phone line was incompatible. "Hours of phone calls later", Ross had arranged to have the ISDN phone line transferred back to a regular analog line for the explicit purpose of getting ADSL.

The technician who visited to do the change told Ross he'd moved his phone line off an ADSL-incompatible RIM and onto a CMUX which would maximise his chances of getting ADSL. After the swap, dialup speeds improved markedly to a record high of 50.6Kbit/s, but when Ross applied for ADSL, he was once again told he couldn't get it. Telstra told him he was still on a RIM. Ross's protestations that the technician had moved him to a CMUX fell on deaf ears.

Eventually, after complaining to his local member of parliament, the ISDN connection was reinstated at no cost. But Ross is still no closer to finding out the true reason he can't get ADSL.

Telstra Public Affairs Group Manager Liz Jurman responded: "Unfortunately, this customer cannot currently obtain ADSL even if the ISDN is removed, and a transposition [to make his phone line compatible] is not available. The service is on a CMUX which is not DSL-enabled, but Telstra plans to enable the CMUX for ADSL early in 2005 as part of our ongoing network upgrade program."

Jurman apologised for the inconvenience and said BigPond would review the wording on its online availability checker to ensure customers were not given the impression that a successful online check meant they could definitely get ADSL.

Contact us

WE WANT TO KNOW
how IT companies are really treating you. Letters must be under 500 words and include your full contact details and any product information. Write to: *watchdog@apcmag.com* or PO Box 4088, Sydney NSW 2001. All correspondence becomes the property of *APC* and is subject to editing.

Warranty's not free

Does a wholesaler have the right to charge a handling fee for warranty claims? Our readers debate the issue.

In *APC* December 2004 (page 27), you published a letter from Alan Downing about the difficulty he had getting free warranty service from Seagate's distributor, Achieva.

I've worked in the computing industry for 15 years and in this case I agree that Achieva had a right to charge a handling fee. Achieva isn't an end-user reseller, it's strictly a wholesaler. Generally speaking, when a wholesaler sells a hard drive they are making 2-3% profit, so on an $80 drive they are making at best $2.40.

When the wholesaler sells this drive to me as a retailer I would then place our store's profit margin on the drive (7% = $5.80). Then freight costs have to be divided across the total number of drives purchased in one shipment. For argument's sake, let's say 20 drives at a freight cost of $30. That adds another $1.50 per drive.

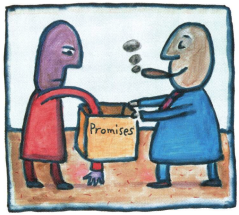
Then I add a warranty freight cost factor of one. That is, I predict that over the three-year warranty period I will see the hard drive come back for a warranty claim once. This amount is $15, so if you add it all up you get the retail sale price of about $115, allowing for GST.

Not all hard drives fail during the warranty period, which is anything between 12 months and three years. So there will be occasions where the retail outlet pockets the $15 as profit and times when drives continually fail. So it evens itself out, and I've been in the industry long enough to know it is usually the retailer not allowing enough warranty "fat" in their costing that eventually sends them broke from excessive warranty claims.

Looking back at Achieva again, for them to charge a figure for something they probably don't factor into their costing is reasonable. I believe Seagate should have informed the customer to deal direct with its contract freight forwarder or directed him back to either the original reseller or the one closest to him that sells that brand of hard drive.

As that closest reseller didn't sell him the drive, it won't be all that happy. But if that reseller is building enough fat into its prices to cover warranty claims, then it should see this as an opportunity to gain a new client by helping out.

Max Williams, Fyshwick, ACT



Empty promises: *readers are divided when it comes to a vendor's warranty obligations.*

ACHIEVA'S APPALLING ATTITUDE

The Seagate saga is typical of some suppliers. I find Achieva's attitude appalling, especially considering that the manufacturer directed the consumer to them to rectify a warranty. I'd have thought it would be handled as part of the normal process of business as I'm sure it would have just been sent off in the next package to Singapore.

Gary Bywater Queanbeyan, NSW

LIFE'S COMPLEX, DEAL WITH IT

Distributors should provide warranty options that strike an acceptable balance between cost and convenience. But whether they should have to provide these services at no cost is another matter. If a buyer purchases

Letter of the month

WHY MICROSOFT IS TO BLAME

Don't blame Microsoft for computer security problems (*APC* December 2004, page 29). Give me a break! Microsoft is entirely to blame for the problems worldwide because of the fundamentally insecure way in which Windows encourages users to set up their systems.

Most home users run as Administrator with full rights to do anything on the system because the Windows installation process doesn't default to requiring users to set up accounts with limited permissions. And most home users don't want limited permissions anyway — or so they think. This is the glaring flaw in Windows that allows viruses and worms to get a foothold easily.

A fundamental principle that operating system designers should follow is to protect the system core at every opportunity, so if damage occurs it will be limited to the user account. This is where Microsoft has failed miserably. This flawed design has existed in every version of Windows and it's about time it was fixed.

All Windows users should be running in limited user mode, and only logging in as Administrator when they need to install software or make a system-wide change.

Even in supercomputer and network server systems, Web server software like Apache only runs as a "user" on a system, not the administrator. A user account doesn't have to be obstructive, but it ought to offer only as much access as a user or process actually needs.

Microsoft's IIS Web server, on the other hand, has a bad habit of running as administrator. This means that if a virus writer or hacker breaks IIS, they have the whole system. This is typical of Microsoft's flawed approach to security.

Peter Dolding Maryborough, Qld

This is an important point: Microsoft could have mitigated its security woes long ago by making it harder for users to set themselves up with an Administrator account. For his insight, Peter snags this month's Logitech LX 700 cordless mouse and keyboard set, worth $199.95.



a product and makes a claim under warranty, do they have reason to complain because the process was inconvenient? Not if the warranty was ultimately met.

I purchased a Netgear router a couple of years ago. It died within the warranty period and I was annoyed to find that I couldn't take it back to the dealer I bought it from. I had to ring Sydney, print out a form, package the router, trudge to the Post Office, and pay for postage. However, Netgear was as good as its word and replaced the router within the advertised time frame. Did I have cause for complaint? No.

Mike Collier
The Gap, Qld

LINUX SLUGGISH AND BLOATED

Recently I borrowed a laptop from my son, a Pentium 3 600MHz Gateway — not a rocket, but great for the road. I also took it as an opportunity to learn Linux, so I loaded Red Hat 9.0 but found the machine sluggish and a total pain to use. In frustration, I loaded Windows 2000 with just the basic packages I needed. The machine ran like a dream, much faster than with Red Hat 9.0 without all the disk swapping and so on.

I know you're shaking your head and thinking that I didn't know what I was doing and that this mucking about is all part of the fun. Believe me when I say I don't want to put any more money in little Billy's pocket than I need to, so not getting Linux to run as I had hoped was disappointing.

Also, while the open source nature of Linux is very appealing, some time spent thinking about the user interface — giving meaningful names to programs would be a start — would make it more usable.

Noel Cunnington
Caloundra, Qld

BITTORRENT NOT JUST FOR PIRATES

Why doesn't Microsoft allow people to distribute service packs via BitTorrent? I use BitTorrent as much as I can for downloads as it gives me the ability to download as I want, to pause or close and resume my download later. It also ensures data integrity.

There's nothing more painful than downloading a large file, finding it to be corrupt and having to repeat the process all over again. With BitTorrent, I don't have this problem as the files are checked for integrity as they are downloaded.

A number of Linux distributions are available for download via BitTorrent. It's time Microsoft considered it too. I would ▶

Agenda: Your place to vent

MUST...REPORT...SPAM...

I run a small Web development business and although many of my clients appreciate the value of the Internet in business, email has started to become so badly clogged with spam they're resorting to faxes again. Talk about going backwards.

I'm sick of reading one article after another giving lame ideas about how to deal with spam. People are missing a vital point. I asked a police prosecutor why the new antispam laws weren't having any effect and was told it was because spam wasn't being reported.

Filtering email as it comes through your ISP is a bad idea because it creates bottlenecks that cause servers to slow and crash. Let's put the laws to the test and turn off ISP filtering so we can actually receive the spam and report it to law enforcement agencies. It's time the law was put to work for us.

Peter Williams
Carindale, Qld

An interesting and well-timed point, Peter. The Australian Communications Authority has joined with ISP Pacific Internet in a spam reporting trial. Readers can find out more about it at *www.pacific.net.au/spam*.



Spam on trial: *more users need to report junk mail for the laws to be effective.*

Error Log

The Hayes Personnel Services 2004 Survey quoted in APC *January, page 23, should have read Hayes Personnel Services 2004 Survey.* APC *apologises for the error.*



Subaru Impreza WRX STi Sports Parts now available to browse online.

Welcome to an exciting new service for Subaru Impreza WRX, STI and Liberty owners. You can now browse online and choose from an impressive selection of genuine STI Sports Parts, which allows you to customise both the look and performance of your Subaru across the following categories:

Body Styling	Brakes	Driveline
Engine	Suspension/Handling	



While genuine STI parts can only be purchased from an authorised STI Dealer, now you can pre-select the parts that best suit you and your Subaru online.
Simply visit **www.sti.subaru.com.au**

STi | SUBARU ALL-WHEEL DRIVE

▶ feel much more confident if I could download a genuine Torrent file from the Microsoft site, open it and download my service packs from other users that way.

Mark Anderson
Dulwich, SA

ACTIVATION RAGE

I am sitting here with steam coming out of my ears! Is this what it has come to when I legally buy software? Product activation gone mad!?

I just purchased Half-Life 2 and the install and product activation has so far taken an hour and a half — and according to the snail crawling across my screen I am only halfway through! God help anyone with a dialup connection. If this is going to be the norm when buying software, I'll wait until I can get a cracked illegal copy.

Ken Price
Wilton, NSW

ONLINE AUCTION FRAUD STRIKES AGAIN

I read with great interest your article on online auction scams (see *APC* December 2004, page 22) as I recently went through the saga of trying to get reimbursed for a fraudulent eBay auction.

The seller was in the USA and at the time of the auction had been a registered eBay seller for over two years, with a positive rating of 98% from over 190 transactions made. The seller was a Square Trade member and only accepted payment through PayPal. The only catch was that the item would not arrive for six to eight weeks as it was over-sized and would be sent via surface mail.

I paid for the item and received an immediate acknowledgement of payment from both the seller and Square Trade. So far everything was looking good.

Six weeks later, my package hadn't arrived and alarm bells started to ring. I checked up on the seller again and its eBay rating had dropped to 90%. After eight weeks they sent me a condescending email telling me to contact PayPal or my credit card company for a "complete refund". They would not enter into any other discussion of the matter.

I immediately logged a claim with PayPal for reimbursement, only to be informed that they were extremely sorry, but because the auction had occurred more than 30 days ago, the claim could not be processed. Great system for anyone considering surface mail! By this time the seller had ceased to be a registered seller with eBay.

I then contacted my credit card company and was told that the transaction with PayPal was legitimate and that as they'd provided me with the service, I'd have to resolve the matter with PayPal. I also went through the Square Trade moderation process to no avail — the seller refused to respond to any of the moderation emails!

At that stage I started going through the fraud protection system with eBay. This involves the claimant sending printed copies of everything to do with the auction to an address in the US. Thank God eBay Australia gives you 90–120 days from the end of the auction to file a claim; if I was going through US eBay, I'd have only been given 60 days and would have been too late.

My claim was received, processed and accepted after a delay of a few weeks and a brief exchange of emails. EBay will reimburse the price of the item minus a US$25 processing fee (unfortunately I can't be reimbursed any of the money paid for postage and handling). Now I'm waiting for the money to be placed back into my PayPal account. Sigh!

Ian Grayden
Karrinyup, WA

EASIER TO PIRATE

I agree with Chris Norton of Gisborne, Vic (*APC* December 2004, page 28) that copy protection is a waste of time.

I recently bought and tried to install a new game on my system, but it was refused as I had CD emulation software installed. To cut a long story short, after disabling some software and uninstalling other programs, I ended up finding a no-CD patch for it anyway.

Upon reading the game's licence, I was disgusted to find that it has all sorts of terms and conditions governing the software you can and can't have on your system. If I'd been presented with the same licence agreement prior to purchase, I wouldn't have bought the game. Until there's a way for me to agree to the licence before purchasing, I don't see why I should be held accountable for any breach of licence.

It's my $90, my game, and I paid for it before I read the licence. So there.

Mark Ayres
Kambah, ACT

WHERE WAS SKYPE?

I have been an *APC* subscriber for many years and it has always been my source of authoritative information for computing. However, I was disappointed to see that your recent article about Voice over IP (see *APC* November 2004, page 100) didn't mention a fairly new but incredibly easy VoIP program — Sykpe. With over 33 million downloads, I'd have thought this program would qualify for a review.

Brian Holland
Perth, WA

APC journalist Dan Warne takes a look at Skype in this month's Opinion ("Don't believe the Skype", page 26) and explains why we think you should avoid it.

TOWNSVILLE WIRELESS

Given *APC*'s recent coverage of wireless broadband in Sydney and elsewhere, I thought I'd bring our company, IQConnect (**www.iqconnect.net.au**), to your attention.

IQConnect is a 3G wireless broadband service based in Townsville, Queensland. USB/Ethernet desktop modems are available, which can be powered either through the mains or a Li-ion battery, as well as PCMCIA units for notebooks.

IQConnect aims to cover regional areas which currently have no access to broadband.

Greg Campbell
Townsville, Qld

Prize Pit

The lucky winners of our January subscription prize of one of eight Brother MFC-620CN Multi-Function Centres are H. Hermans of Box Hill North, Vic; B. Gucella of Byron Bay, NSW; N. Finlay of Jesmond, NSW; R. Turner of Kyogle, NSW; M. Turnham of Doncaster, Vic; G. Ducasse of Lakemba, NSW; J. McLaren of Rosanna, Vic; and J. Vriens of Geelong, Vic. Congratulations!



Have your say

Add to these discussion threads or email your views (in fewer than 500 words) to **epinions@apcmag.com**.

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REAL WORLD ★TESTING★

On Test

Detailed product reviews and comparisons

apc Labs Challenges

50 Best Buys
Every month, *APC*'s technical editor *Matthew Overington* compiles this guide to the hottest software and hardware products on the market.



54 Hardware Sub-$2000 PCs
Two grand buys a lot of PC these days. *Nick Race* and *Asher Moses* run eight systems through the Labs.



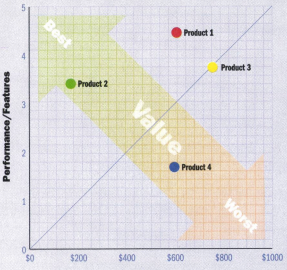
60 Hardware External hard drives
Forget USB memory keys, you want one of these babies for maximum storage.



68 Software Image editing programs
Which apps are best for serious digital camera enthusiasts? *Denis Gallagher* puts seven contenders to the test.



apc price-to-performance ratio



The APC price-to-performance ratio is a scatter graph, each point representing a reviewed product. The X axis represents price, and the Y axis indicates features and performance as derived from the verdict awarded to each item. The diagonal line represents a line of expectation — as prices increase, a proportional increase in features or performance is also expected.

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Nvidia's long-awaited chipset allows two video cards to be run side by side.

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46 Hardware MetaPass Digital Key
Metapass has a solution for those who have to remember hundreds of online passwords.

47 Hardware CMV CT-720D
Sub-10ms TFT panels are finally here, and CMV's offers great value.

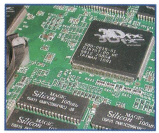
47 Hardware 5GB Seagate Pocket Drive
A tiny drive that provides an elegant, portable storage solution at a reasonable price.

48 Hardware Dell Axim X50v
Dell shakes up the PDA market again with its new Axim model.

48 Hardware HP iPAQ h6365
HP shows that, with a little compromise, you can be all things to all people.

ASUS A8N-SLI Deluxe and N6600GT

Nvidia's long-awaited chipset allows two video cards to run side by side. *Matthew Overington* investigates.



Old school: *Nvidia has dredged up a tried-and-tested idea in pairing two video cards.*

It's no secret that gaming is massive. In fact, the US$10 billion games industry has already overtaken Hollywood in terms of revenue, driving the demand for high-performance hardware which can make the most of today's top gaming titles. After Intel released its 9xx-series chipsets in 2004, the AMD64 platform fell behind a little when it came to chipset features. Intel had the lead on PCI Express support and native DDR2 memory, leaving AMD customers, many of them performance-hungry early adopters, longing for chipset updates.

AMD has caught up, though, as ATI and Nvidia have announced new chipsets for the 64-bit processors with features that even the Intel-compatible solutions lack, including support for Serial ATA II and a clever video system upgrade.

The Nvidia nForce4 series chipsets are available in three flavours: regular, SLI and Ultra. The base model includes a basic hardware firewall, PCI Express, RAID, Gigabit Ethernet and Serial ATA (150MB/s) support. The Ultra and SLI models include all this, plus support for Serial ATA II (375MB/s) and updated hardware protection called ActiveArmor that palms off packet-filtering tasks to a hardware module, freeing up CPU time.

The only major difference between the Ultra and SLI models is that the SLI can drive two graphics processors simultaneously. This splits the processing load across the two cards, which requires specially engineered motherboards (like the ASUS A8N-SLI), two identical SLI-compatible video cards and an SLI bridge to link the two cards together. This is the gamer's equivalent to fitting two processors to a system to speed up complex, CPU-intensive tasks and has been promised as the solution for next-generation video performance. Currently Nvidia is the only video manufacturer looking at SLI implementations — ATI has announced that it isn't going to provide support in the near future.

SLI requires a motherboard with two PCI Express x8 lanes and two identical, SLI-compatible video cards, which has required a substantial investment in new engineering from Nvidia. Currently the company has only announced SLI compatibility for GeForce 6600GT and GeForce 6800GT cards, though the range is expected to increase further down the track as new cards are announced.

The system works by splitting the screen in half and the processing between each card. The cards "talk" to each other directly via a bridge — either a ribbon cable or a printed circuit board (PCB) — and output the rendered result via one of the video card's VGA or DVI ports.

Benchmarks

3DMark2001 SE 1,024 x 768			
0	Nvidia eForce 6600GT (SLI)	19,494	30K
0	Nvidia GeForce 6600GT (single)	19,722	30K
0	ATI Radeon X800	23,161	30K
3DMark03 Pro 1,024 x 768			
0	Nvidia eForce 6600GT (SLI)	13,721	20K
0	Nvidia GeForce 6600GT (single)	8,434	20K
0	ATI Radeon X800	10,117	20K
3DMark2001 Pro 1,280 x 1,024 w/ 4x AA/AF			
0	Nvidia eForce 6600GT (SLI)	5,465	10K
0	Nvidia GeForce 6600GT (single)	3,627	10K
0	ATI Radeon X800	4,110	10K
Doom 3 1,024 x 768 pixels (fps)			
0	Nvidia eForce 6600GT (SLI)	92	100
0	Nvidia GeForce 6600GT (single)	77.7	100
0	ATI Radeon X800	91.3	100
Doom 3 1,280 x 1,024 pixels (fps)			
0	Nvidia eForce 6600GT (SLI)	81.3	100
0	Nvidia GeForce 6600GT (single)	57.5	100
0	ATI Radeon X800	73.3	100
Doom 3 1,600 x 1,200 pixels (fps)			
0	Nvidia eForce 6600GT (SLI)	66.1	100
0	Nvidia GeForce 6600GT (single)	42.2	100
0	ATI Radeon X800	55.4	100
Far Cry 1.3 1,024 x 768 pixels (fps)			
0	Nvidia GeForce 6600GT (SLI)	64.22	100
0	Nvidia eForce 6600GT (single)	71.87	100
0	ATI Radeon X800	74.36	100
Far Cry 1.3 1,600 x 1,200 pixels (fps)			
0	Nvidia GeForce 6600GT (SLI)	58.67	100
0	Nvidia eForce 6600GT (single)	40.26	100
0	ATI Radeon X800	66.12	100

Two cards: *In most instances, SLI does boost performance.*

REINVENTING THE WHEEL

Although this sounds like a clever new trick to boost video performance, it's actually a recycled concept. The now-defunct company 3Dfx pioneered the technology with its range of Pure 3D II cards, which also had the ability to split rendering duties across two video processors. The system relied on two PCI-based video cards linked directly via a cable. 3Dfx also called its technology SLI, though it stood for Scan Line Interleave, not Scalable Link Interface.

Nvidia decided that the way to push video performance beyond its thresholds was to dredge up this older concept and rework it for modern architecture. The two systems differ in one key area: 3Dfx relied on each card to render alternate scan lines, rather than assigning a section of the screen to each. The 3Dfx solution fell by the wayside with the advent of AGP ports, as their design prevents two slots from running together on a motherboard.

FIRST LOOKS

APC managed to track down a number of ASUS components to put Nvidia's SLI solution through the wringer. We started off with an A8N-SLI motherboard and matched it to two 128MB Nvidia GeForce 6600GT video cards. The motherboard ships with a PCB bridge: it's not something you have to hunt down yourself. An Athlon 64 FX-55 processor, 1GB of PC3200 Kingston ValueRAM and 250GB Maxtor MaxLine III Serial ATA hard drive were then fitted and the SLI configuration was benchmarked against a single 128MB Nvidia GeForce 6600GT video card and ATI Radeon X800XT.

Nvidia claims a 1.87x performance boost by fitting two cards in an SLI configuration, though these figures couldn't be matched during testing. In fact, at 1,024 x 768 under 3DMark2001 SE, both the ATI X800XT and single Nvidia GeForce 6600GT managed to marginally out-perform the SLI setup.

This is because the overhead involved in getting the two cards to communicate effectively negates the performance benefit in this older test.

Testing at 1,024 x 768 under 3DMark2003 turned the tides, though, with the SLI solution managing a handy lead over both the X800XT and single 6600GT solutions. Ramping up the screen resolution had an even more dramatic effect on this performance gap, with the SLI solution showing up a clear winner in both 3DMark2001 and 3DMark2003 testing at 1,280 x 1,024 pixels, with 4x anti-aliasing and anisotropic filtering enabled.

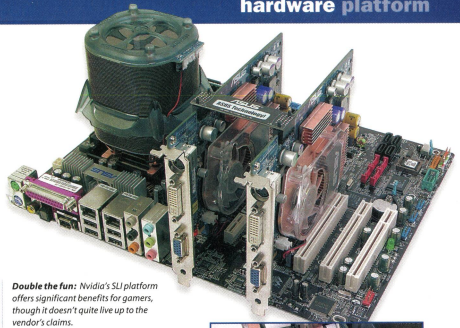
Gaming tests echoed these results, with the SLI solution managing to maintain its performance as the resolutions were scaled up. Doom 3 saw the SLI setup go from 92fps under 1,024 x 768 to 81.3fps at 1,280 x 1,024, and 66.1fps at 1,600 x 1,200. This contrasts with 77.7, 57.5, and 42.2fps for the single 6600GT and 91.3, 73.3 and 55.4fps for the X800XT.

It's no secret that Doom 3 favours the Nvidia GPUs, so we also tested under Far Cry 1.3. Here the GeForce 6600GT SLI configuration couldn't match the performance of the more expensive ATI Radeon X800XT, scoring 64.22fps and 74.36fps respectively. Again, the gap was reduced as the resolution was scaled up, but not as dramatically as in other tests. At 1,600 x 1,200 pixels, the SLI setup dropped 6fps to reach 58.67fps, while the Radeon X800XT dropped 8fps to 66.12fps.

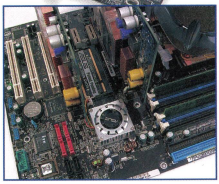
The dual 6600GT configuration was slower than the single card setup at 1,024 x 768 (71.87fps over 64.22fps), but scaling up dramatically turned the tide — the single card could only manage 40.26fps at 1,600 x 1,200. This indicates that the biggest boost will come playing games at high resolutions, but it still falls short of the mark set by Nvidia.

SLI FOR PENTIUM 4?

At the time of writing, a number of motherboard manufacturers, including Gigabyte, were working on SLI implementations for Pentium 4 boards. This requires a fairly substantial reworking of the existing board designs to provide a second PCI Express x8 slot on the board to accept a second video card, and is likely to be something of a kludge to get working efficiently. Nvidia potentially has a leg-up here, as the company has been responsible for both the design of the chipset and GPUs, enabling the company to have total control over the design and production process — a system that has served Apple well since the company's inception. Expect *APC* to bring you a review with benchmark results as soon as we can get a production model into the labs for testing.



Double the fun: *Nvidia's SLI platform offers significant benefits for gamers, though it doesn't quite live up to the vendor's claims.*



Duet performance: *Nvidia's nForce 4 chipset allows for two PCIe x8 slots.*

The prohibitive cost does count against this solution. An SLI-compatible motherboard will set you back around $300, and you then have to factor in the cost of two video cards and, in the case of beefy solutions like Nvidia Geforce 6800GTs, a large power supply. Gamers have shown that they are willing to pay for extra performance, so the SLI solution will find a home with the more dedicated frame-rate junkies. But the idea of chasing down two identical video cards and a compatible motherboard will deter most casual users, and those who don't play games regularly are advised to avoid the technology.

Given that the ATI Radeon X800XT is nipping at the heels of the dual Geforce 6600GT SLI implementation in terms of performance and price, it'll be interesting to see how the upcoming ATI Radeon x850 will perform on a dollar-per-frame basis. At present, the performance boost offered by the SLI solution is enough to attract some hard-core gaming enthusiasts and keep sales of Nvidia's cards ticking over, but it's a niche solution. BTTB

Nvidia nForce 4 chipsets at a glance

Feature	nForce 4	nForce 4 SLI	nForce 4 Ultra
Nvidia SLI support	N	N	Y
PCI Express support	Y	Y	Y
SATA support	150MB/s	300MB/s	300MB/s
Onboard RAID	Y	Y	Y
Inbuilt protections	Nvidia Firewall	Nvidia ActiveArmor	Nvidia ActiveArmor
Gigabit Ethernet	Y	Y	Y

Details

Contact	ASUS
Online	www.asus.com.au
Price	ASUS A8N-SLI Deluxe Motherboard, $299; ASUS N6600GT Nvidia Geforce 6600GT, $399 each
Intended market	Prosumers
✔	Solid benchmark scores.
✖	Limited appeal.
Verdict	★★★½☆

Optima WorkPro K8

The arrival of mainstream 64-bit processors has helped rejuvenate the workstation market.



Kiss me K8: *Optima's newest workstation is a respectable choice, though the performance doesn't quite live up to its specs.*

Sales of workstations have picked up since AMD and Intel started offering cheaper alternatives to Intel's traditionally expensive Xeon range. Optima's WorkPro offers a set of features attractive to CAD workers, architects and anyone else who needs a lot of processing power.

SPECCED UP

The K8 system ships with 1GB of RAM and an AMD Athlon 64 3000+ processor fitted to a Gigabyte GA-K8VM800M, VIA-based motherboard. This is matched to a pair of 160GB Seagate Barracuda 7200.7 Serial ATA hard disk drives, configured in a striped RAID array. Two PCI connectors are free on the board, but there are no spare RAM slots.

An AGP MSI-branded ATI Radeon X800 PRO graphics card is included, an unusual choice for this type of machine. While the Radeon is a great card for gaming, an ATI FireGL card would suit people working with CAD or high-end graphics applications much better, as it offers superior 2D performance.

The kit is housed in a small beige and grey tower case with two external 5.25in slots. A Pioneer DVR-A08 multiformat DVD writer occupies the top position, leaving a blank plate and floppy drive below. The front panel contains FireWire, two USB 2.0 ports, and headphone/microphone sockets. There are another three FireWire and four USB 2.0 ports at the rear of the machine. This is supplemented by onboard Gigabit Ethernet and legacy parallel and serial ports.

The system ships with a functional Optima-branded multimedia keyboard with volume and CD player controls and a wired optical mouse. The keyboard was a little clacky during testing, and the lightweight mouse — though functional — isn't as comfortable as rival Logitech or Microsoft designs.

The test machine featured a 17in TFT with glass-coated screen, though other display options — both CRT and LCD — are available. The submitted model features small speakers in the front panel that are fine for system beeps, though side-mounted buttons make image adjustment tricky. Thankfully, the auto-adjust button did a good job of configuring the display at the native 1,280 x 1,024 pixels, and also handled scaling from lower resolutions well.

GO SLOW

Despite the impressive system specs, the machine didn't set the lab on fire. It managed respectable but not blistering scores of 22.3 under Multimedia Content Creation Winstone 2004 and 22.8 under Business Winstone 2004.

The WorkPro fell just short of 4,000 under PCMark04 and the Radeon X800 Pro failed to outscore the PCI Express-based Radeon X700XT and GeForce 6600GT in video benchmarking (*APC* February, page 36), even though the X800 card fitted in the WorkPro was superior. However, the 3.4GHz Pentium 4 processor used to test the mid-range cards also contributed to the results.

Decent scores of 16,686 under 3DMark2001 SE Pro, 8,283 under 3DMark03 and 2,215 under 3DMark05 indicate that the WorkPro system is certainly quick enough for modern gaming, though this is largely irrelevant in a workstation. Buyers considering the WorkPro as an all-round system which will be used for some gaming will be pleased with the configuration, though.

The driver and BIOS settings were tweaked in the lab to squeeze out a few extra points. Upgrading to the latest drivers for the motherboard and video card provided a jump to 3,102 under 3DMark05, showing that a little tweaking can go a long way. This was further backed up by a score of 30.2 under Multimedia Content Creation Winstone 2004.

Microsoft Windows XP Home with Service Pack 2 was pre-installed upon shipping from Optima, though the only applications included were OEM versions of the Nero Suite, including Nero Express, BackItUp, Cover Designer, Media Player, ShowTime, Recode and NeroVision Express.

XP Home doesn't function well in an enterprise environment as it's missing support for domains, making it a relatively poor choice for a workstation. Also, though many companies will supply their own productivity software, including a few packages like Microsoft Office on the Optima system would make it much more attractive to small businesses with more modest IT budgets.

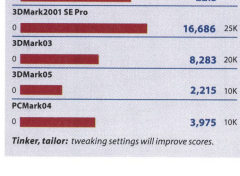
The Optima WorkPro K8 comes with an excellent three-year onsite warranty.

Matthew Overington

Details

Contact	Optima
Phone	1300 138 240
Online	www.optima.com.au
Price	$2,799
Intended market	Business
✔	Solid build and specs.
✖	Disappointing software bundle.
Verdict	★★★½☆

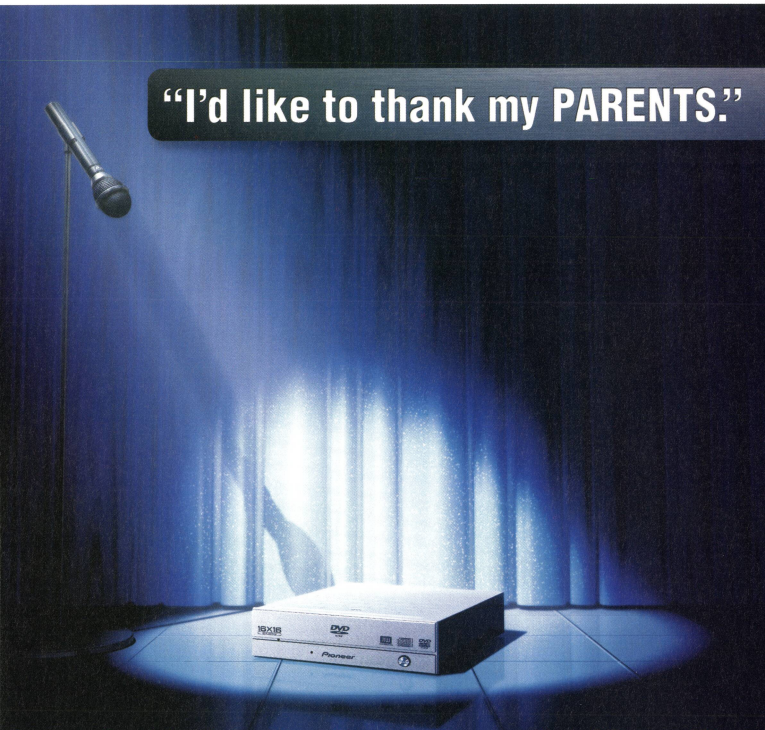
Benchmarks



Tinker, tailor: *tweaking settings will improve scores.*

Pioneer sound.vision.soul

"I'd like to thank my PARENTS."



Born into a multi award winning family and blessed with perfect features. It could only be the new DVR-A09XL from Pioneer. Writing to DVD-/+R at a show-stopping 16X (to verified 8X media) this beautiful new machine displays all the talent Pioneer is famous for. With 6X dual layer recording, there's even room to record 8.5 GB of information on one side of a DVD* in around 20 minutes. Ably supported by award winning software from Ulead (including DVD Workshop 2 SE and Video Studio 8 SE) the legend is set to continue. For the full picture, call our academy of experts on 1300 666 383 or visit www.pioneeraus.com.au

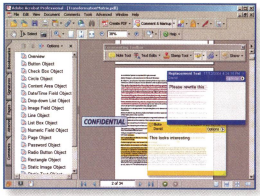
•6x FOR DUAL LAYER •16x FOR SINGLE LAYER



*Verified dual layer DVD media must be used.

Adobe Acrobat 7.0 Professional

Sharing documents doesn't have to be a pain. Acrobat 7.0 Professional can act as your information hub, and the new version is quicker too.



Hide and peek: *Acrobat security policies make it easy to control document access.*

Like a digital tower of Babel, Adobe Acrobat Professional 7.0 is really a universal translator. When it's installed, you can create PDF files from electronic documents, scans and even Web pages. Once "distilled" into PDF form, documents can be read by anyone with PDF-savvy software.

With recent updates, Adobe has focused on adding features for creative and technical users, as well as business functions like document security and group collaboration. The company has also tackled speed issues. Under testing, Acrobat 7 started up in three to four seconds, about half the time it took version 6, and subsequent launches were nearly instantaneous.

Acrobat Professional is the priciest in Adobe's range of Acrobat-branded products. It packs more tools for manipulating and navigating documents, and offers one-click translation of files from Microsoft Office, Publisher, Visio, Project and Autodesk's AutoCAD. Acrobat Elements and Acrobat Standard are the cheaper, less capable editions. Professional and Standard can be purchased individually, while Elements is only available in batches of 100 or more.

Global domination

PDF is a big deal for Adobe. Years ago, the company standardised all its big-name products around the portable document format and says there are now over half a billion Adobe Readers installed worldwide.

What you pay for

Like a lot of apps nowadays, Acrobat has some features which rely on additional products to work fully. It pays to know that advertised improvements can also be sales hooks in disguise.

Highly Recommended March 2005 apc

Details

Contact	Adobe Australia
Phone	1300 550 205
Online	www.adobe.com.au
Price	$849; upgrade, $289
Intended market	Business
✔	Faster; more open reviews; better security.
✖	Few new features; a tad interdependent.
Verdict	★★★★☆

LOCK AND LOAD

Security is one of Acrobat's key selling points. In the latest version, the file-protection features are reorganised around the concept of security policies, to be viewed and edited through a central window. Policies can be created based on passwords or digital certificates. Additional options are possible, but only if you have Adobe Policy Server.

A password-based policy can be used to encrypt a document and block certain functions, such as high resolution printing. Certificate policies offer finer-grained protection, scrambling data according to the recipient's unique digital ID. Both levels of security can be made to work with older versions of Acrobat, although certain features such as AES encryption and search engine visibility won't be available in that mode.

For secure file delivery, Acrobat 7 introduces the eEnvelope workflow. Usually, PDFs are built from one or more source files and then distributed in converted form. eEnvelope is a twist on this approach, using a skeleton PDF file as a carrier for 128-bit encrypted attachments. These may or may not be in their original format.

FEEDBACK LOOP

Because Acrobat can handle data from so many sources, it works well for collaborative review and editing. Acrobat 7 has a variety of commenting and mark-up tools. Reviews are monitored through a Tracker window, and incoming comments can be rolled into a master document or viewed separately.

The big news is that email-based reviews are no longer limited to Acrobat users. For the first time, you can use Reader to participate in commenting sessions without buying additional software. Files are emailed to any recipient, and as long as they have Acrobat or Reader they can submit feedback.

Acrobat 7 also allows browser-based reviews, but setup isn't easy. Storing PDFs and comments online requires WebDAV, which is rarer than FTP or even Secure FTP. And Adobe Reader users can't take part in browser reviews unless they have Reader Extensions Server.

Bundled with Professional is Adobe LiveCycle Designer 7 for creating and scripting PDF forms. These can be printed, or capture data onscreen and return it by email. Designer supports two scripting languages, FormCalc and JavaScript, and comes with a stack of business templates. Or you can import a PDF or Word document and start from there.

READ ME

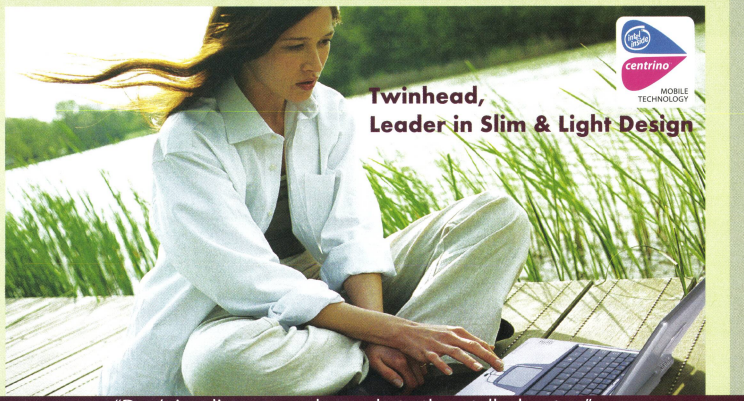
A cornerstone of the Acrobat platform is the free Adobe Reader, also faster this time around. It can be used to view and print documents, fill in interactive PDF forms and manage ebook collections. With no files open, Reader 7's memory footprint is 33MB, about 8MB less than before. Initial loading time is also reduced thanks to Adobe Reader Speed Launch.

Versions 6 and 7 of Reader look nearly identical. Some menu and preference items have been added or shuffled, but that's about it. There are a few hidden goodies, like the commenting toolbar, but this doesn't show up unless the loaded document has had "additional usage rights" attached.

Acrobat 7 Professional is also available as part of the Adobe Creative Suite Premium 1.3 ($2,499).

This is an impressive package overall. As an upgrade, much of what's new is either incremental improvement or up-sell on server software. Value-added extras like Reader email reviews and the bundled forms designer — not to mention the speed boost — do justify the price tag, though.

David Emberton



"Don't just listen to us, hear what others talk about us"

Enjoy the strenght of Twinhead Slim & Light design model and our rugged eflo 15B with Spill Proof Keyboard and IMPAX Protection.
Your Ultimate Notebook Computing Stop Here

Twinhead recommends Microsoft® Windows® XP Professional for Business



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  Intel 855 GME Chipset
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  Intel 855 GME Chipset
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- 256Mb / 512Mb / 1Gb DDR 333
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- 14.1" XGA TFT Screen
- 3 x USB 2.0 Port, VGA Port
- PCI LAN Combo Card
- 64Mb Graphic Memory
- Windows XP Home Pre-installed
  (With Recovery CD)
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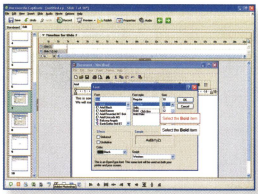
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Macromedia Captivate

It's now easier than ever to create training materials for PC users with Captivate.



What to do: *captions generated automatically by Captivate provide instructions and indicate an incorrect action.*

"What you see is what you get" has been the software mantra ever since WordStar was the dominant word processing package. But with screen-recording software, it's more a case of "what you saw is what you get" — and that's far less satisfactory. If you make a minor mistake, you have to recapture the affected part of the sequence. Captivate solves that problem by capturing system events, so you can go back and adjust the path or completely delete a fudged step, making it easy to create a clean demonstration.

Captivate is a new version of eHelp RoboDemo, which Macromedia acquired in late 2003, and it's for those who create demonstrations, simulations or tutorials. In this review we'll use "demo" as a generic term, but keep all three possibilities in mind. It's especially relevant for creating training material related to computer use (for example, how to fill in an electronic timesheet), but you can also import PowerPoint slides.

LET'S TALK ABOUT TEXT

After capturing a demo, Captivate automatically adds text captions for operations such as menu selections and button clicks. They will often be satisfactory, but you can change the text or style, delete captions or add new ones. You can also apply style changes automatically to all captions in the demo, which can be a real time saver.

Finetuning is easy thanks to a timeline-based view that will be familiar to users of audio or video editing software. One thing you can't do is correct individual typing errors: that sequence of keystrokes will need to be redone. Voice-overs can be captured while the demo is being recorded, or added during editing. Simulations are as easy to record as demonstrations — in this mode, Captivate automatically generates captions which tell users what to do and alerts them if they do something else.

Scoring can be added, either for responses to specific questions or to instructions in a simulation. The program can handle a variety of question types, including multiple choice, yes/no, Likert (strongly agree and so on) and short answer. This feature can also be used for surveys with no correct answers.

Various actions can be triggered by correct and incorrect answers, including jumping to a particular point in the demo, opening a URL or file, or executing a JavaScript. It's also possible to limit the number of attempts, so a student who hasn't understood a concept can be required to repeat the material or directed to a remedial section.

Captivate works with learning management systems compatible with SCORM (Shareable Content Object Reference Model) and AICC (Aviation Industry CBT Committee), and quiz scores can also be reported via email.

Completed projects can be published in various formats: Flash, typically for incorporation in Web pages; standalone executables, for Windows, Mac or Linux; and as Word handouts showing individual slides. This means no special software is required to play back a Captivate demo, as an overwhelming majority of computers have Flash Player installed.

RESULTS IN A FLASH

The Flash option can include an HTML file with just enough code to display the demo. Flash files are fairly compact: a demo which showed a sentence being typed into WordPad and then turned into bold text was roughly 130KB. During testing, Word output from one demo included some placeholder text that wasn't visible in the Flash version.

Captivate demos can be sent via email as an alternative to saving them to disk or directly to an FTP or Breeze server. Breeze is Macromedia's system for online meetings, presentations and training courses. When a Captivate demo is included in a Breeze session, each participant gets a separate copy and can interact independently with it.

System requirements are Windows 2000 or XP on a 600MHz Pentium III or equivalent, with at least 128M of RAM and an 800 x 600 display. It's unlikely XP will be running on such a low-spec system.

RoboDemo 4 or 5 owners can upgrade for a reasonably discounted price. Major changes in Captivate include the timeline-based editing, improved capturing, simple audio editing, and more flexible test design. Phone/email support options range from US$99 for a single incident to US$3,000 per year for unlimited incidents with a two-hour response time during business hours.

Captivate simplifies the creation of training materials and it will allow organisations to create customised modules that reflect their specific environment, such as how to connect to a particular file server, apply for time off or use a library of standard letters. It may be on the expensive side, but that's offset by the absence of runtime costs.

Stephen Withers

Keep it simple

If you're after a plain screen capturing program capable of outputting to a video file, the best bet is TechSmith's Camtasia Studio (*$445.74*; www.infotronics.com.au*). We use the application at APC to record software demos and it offers a fine blend of functionality and ease of use. For more information, see www.techsmith.com.

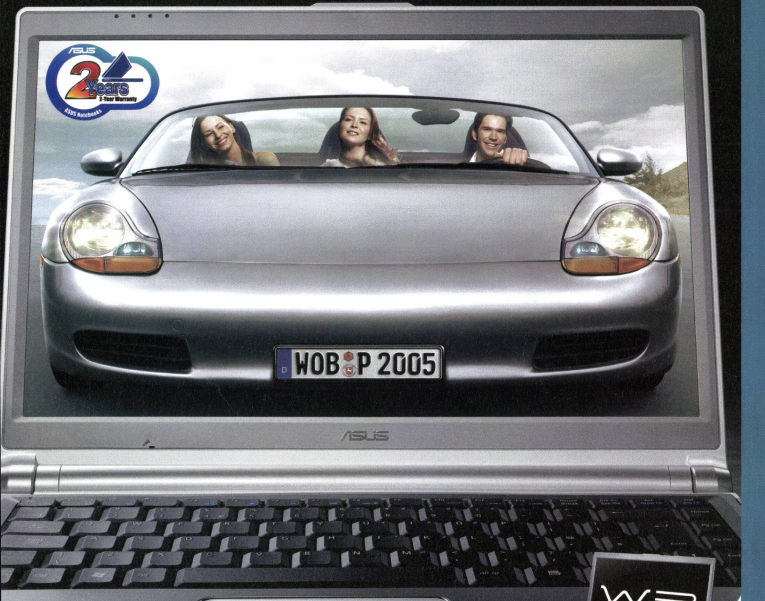
Details

Contact	Macromedia
Phone	1800 001 014
Online	www.macromedia.com.au
Price	$800; upgrade, $485
Intended market	Prosumer/business
✔	Flexible, powerful software.
✖	Some text issues.
Verdict	★★★½☆

ASUS recommends Microsoft® Windows® XP Professional for Mobile Computing

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MOBILE TECHNOLOGY

comfort: Open Up and Unlock A World of Possibilities



The W3000A offers total vision satisfaction for both work and play. The widescreen is perfect for entertainment applications and multi-tasking is now possible with the W3000A's option of displaying two windows simultaneously. The new Color Shine display technology further delivers higher brightness and rich color contrast, making the W3000A great for both work and entertainment. Open up the ASUS W3000A and unlock a world of possibilities.

Comfort: Just Stretch Out

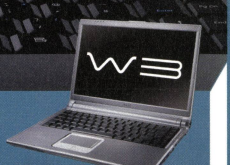
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Sony DRU710A Double Layer DVD burner



Editor's Choice March 2005 apc

Details	
Contact	Sony Australia
Phone	1300 138 246
Online	www.sony.com.au
Price	$179
Intended market	Everyone
✔	Fast; free upgrade to 4x Double Layer writing.
✖	Only burns DVD-R at 12x.
Verdict	★★★★½

Sixteen speed and a Double Layer boost keep Sony's drive burning.

Sony's DRU700A was the first Double Layer burner to land in the *APC* Labs (*APC* August 2004, page 45), and it impressed with its ability to churn out an 8.5GB disc at 2.4x. Working up from there, Sony has released the DRU710A, though it's not breaking any new ground this time. The drive supports single layer writing of DVD+R discs at 16x, completing a burn in five minutes and 47 seconds, a full minute faster than Pioneer's DVR-A08 16x Constant Linear Velocity (CLV) drive (*APC* October 2004, page 52).

The Sony drive operates in Constant Angular Velocity (CAV) mode, beginning its burn at around 6x, and working up to its maximum rated 16x at the end of the recording. Although it's marketed with DVD-R capabilities at 8x, Sony has made firmware available via its Web site to increase to 12x burning with DVD-R media. Re-writing for both DVD+RW and -RW takes place at 4x.

Double Layer burning gets a boost through Sony's updated firmware, which enables the drive to churn out data at 4x, meaning the drive takes 26 minutes and 47 seconds to create a DL disc.

This is the new record breaker in the *APC* Labs, beating the Pioneer A08's previous best by 15 seconds and the previous generation of Sony Double Layer drives by a full 15 minutes.

The drive supports CD-R writing at 48x and rewriting at 24x with appropriate media. Tests showed the drive can write a 700MB CD in two minutes and 53 seconds, averaging 32.34x over the length of the disc. DVD reading is supported at 16x for single and Double Layer media.

The drive is bundled with the solid Ahead Nero 6 OEM kit: NeroVision for encoding media files, Nero Media Player for playback, and InCD — a packet writing software for CD and DVD-RWs. A plain black faceplate, IDE cable, quick start guide and operating instructions complete the package.

The biggest problem facing buyers of 16x drives is the limited media available, with no guarantee they'll work with a particular drive. Our 16x testing used Verbatim DVD+R 16x discs, and unlike some other 16x drives we've tested, no 8x media available to us could burn at 16x. Therefore it's important that the buyer keep the drive up-to-date with the latest firmware.

Nick Race

iEmulator 1.7.0



Low power: *those with meagre requirements will appreciate iEmulator.*

Details	
Contact	iEmulator
Online	www.iemulator.com
Price	US$23.95
Intended market	Everyone
✔	Functional, clear instructions.
✖	No real improvement on free alternative.
Verdict	★★☆☆☆

Does a $30 PC emulator represent good value for Mac owners?

Do you want PC emulation on your Mac but find Virtual PC too expensive? IEmulator is comprised of the open source Qemu emulator plus clear instructions, a Mac OS-native user interface for configuring and launching without resorting to the terminal, and a free DOS-replacement operating system. It costs US$23.95 and you can buy Windows on eBay from $10 to $150. This compares well to Microsoft's $449 Virtual PC for Macintosh 6.1 with Windows XP Home.

The optical drive can't be accessed by the emulator, so you must use Disk Utility to copy a CD to a disk image file and set that up as D drive. If the OS CD isn't bootable (as with some Windows 98 CDs), you'll also need a Mac with a floppy drive to create an image file of the boot floppy.

Emulators are usually slow unless you have modern hardware emulating an obsolete platform such as a Commodore 64. Even on a 1.5GHz PowerBook, iEmulator grinds away slowly. Installing Windows XP took about four hours, while 98SE took a more reasonable 90 minutes. Windows 98SE started up in a bearable two minutes, compared with a glacial six for XP. By comparison, Virtual PC 6 starts up Windows 98 in around 50 seconds. Mac OS X's Activity Monitor suggests the program is processor-bound, so expect better performance on a faster CPU.

Once Windows is running, you'll notice slow mouse and video response, but the performance varies between applications. A 1,000-record Access database sort that was immediate on an Athlon XP1800+ system took two seconds on iEmulator and Windows 98. But it can also be frustrating: it took one and a half minutes to open *APC*'s home page under iEmulator on the Mac, compared with 10 seconds on the Athlon XP PC. Not surprisingly, Windows 98 or 2000 are recommended over XP.

iEmulator is essentially Qemu plus a front end and easy-to-follow instructions. Since there's a free front end called QemuX (**http://cordney.com/QemuX**) that performs the same function, no-frills PCs are inexpensive and used PCs are as cheap as chips, it's hard to see why you'd pay for iEmulator. Obvious tasks are using Access databases, visiting Web pages crafted specifically for Windows browsers and flashing an optical drive's firmware — but your patience may be challenged.

Stephen Withers

ASUS recommends Microsoft® Windows® XP Professional for Mobile Computing

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The ASUS W5000A's stylish design for modern sophistication is perfect for today's urban metropolitans who demand more than functionality in digital devices. No matter where you are, the W5000A's built-in 1.3 mega-pixel 180° swivel webcam will bring your vision to wherever you wish to be. Built-in microphone and the exclusive LiveFrame software, especially developed for the W5000A, allow easy capturing, recording and playing of photos and videos. The new Color Shine display technology further delivers higher brightness and rich color contrast, making the W5000A the best personal stage to see and be seen.

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- Microsoft® Windows® XP Home/Professional
- 12.1"WXGA
- ASUS LifeFrame video capturing software
- Bluetooth™(optional)

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Acer Ferrari 3400LMi



It's red, it's glossy, it features the famous prancing pony, and it really does go faster.

The glossy red finish on Acer's latest F1-inspired Ferrari model really makes it stand out. The style isn't to everyone's taste, but Acer is certainly making the most of its association with Ferrari.

Beyond the aesthetics, the machine is well appointed. The 3kg Acer Ferrari 3400LMi is configured with a Mobile AMD Athlon 64 3000+, mated to an 80GB hard disk and 512MB of RAM. A 15in SXGA screen runs at a native resolution of 1,400 x 1,050 pixels. The system also features a 128MB ATI Mobility Radeon 9700 processor, which helped the machine achieve solid benchmark results under video testing. The system scored 10,743 under 3DMark2001 SE, and 3,049 under 3DMark03 Pro.

Other benchmarks are also impressive. The Ferrari managed 24 under Multimedia Content Creation Winstone 2004 and 20.8 under Business Winstone 2004. These solid scores were backed up by a PCMark04 figure of 3,760, proving it worthy of its association with the prancing horse.

A slot-loading 4x multiformat DVD drive is fitted, with a dust-protector to help protect the sensitive optics from particles in your notebook bag. The front left-hand side of the palm-rest gets warm during operation, but it's not unbearable, even on longer train or bus trips.

Gigabit Ethernet is included, along with four side-mounted USB ports that are sufficiently spaced to accept two USB keys side by side. FireWire, PC card and S-video outputs are provided, along with Bluetooth support and 802.11b/g Wi-Fi. A 4-in-1 card reader rounds out the front panel, covering all the most popular card formats except CompactFlash.

The review machine shipped with Windows XP Home — fine for most people, though corporate users will prefer to upgrade to XP Professional. No productivity software was included.

The mobile Athlon 64 does demand some current to run, but BatteryMark 4.0.1 testing pegged life at two hours and four minutes, which is ample for most commuters — even sufficient to watch a DVD movie. The system ships with a matching red Ferrari USB mouse and a protective sleeve that doubles as a polishing cloth — a great idea as the outside of the clamshell has a high-gloss coating.

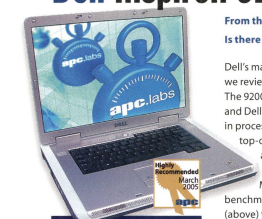
A one-year warranty is included as standard.

Matthew Overington

Details

Contact	Acer
Phone	1300 366 567
Online	www.acer.com.au
Price	$3,499
Intended market	Performance enthusiasts
✔	Good performance.
✖	No productivity software.
Verdict	★★★½☆

Dell Inspiron 9200



From thin and light to a desktop replacement. Is there anything the Pentium M can't do?

Dell's massive Inspiron 9100 impressed *APC* when we reviewed it last year (*APC* May 2004, page 46). The 9200 is the follow-up to that hulking unit, and Dell has made a few changes, most noticeably in processor selection. The 9200 now boasts a top-of-the-line 2.1GHz Pentium M processor and 1GB of RAM.

The 3.7kg machine includes an ATI Mobility Radeon 9700, but manages superior benchmarking scores to the Acer Ferrari 3400LMi (above) thanks to the faster processor. The system racked up scores of 12,146 and 3,247 under 3DMark2001 SE and 3DMark2003 Pro respectively, indicating that it can keep up with some modern games (albeit at lower resolutions). This graphics power is being put to use: a 17in screen runs at the massive native resolution of 1,920 x 1,280 pixels and produces a clear, even image.

The machine also proved an absolute rocket in other benchmarks, scoring 20.5 under Multimedia Content Creation Winstone 2004 and 23.4 under the Business version, proving that desktop replacements don't need to have desktop processors.

The review model features a 60GB Hitachi hard disk and an 8x Double Layer, multiformat DVD writer. A row of quick play buttons sits on the front of the shell, accessible even with the lid closed.

The rear panel has VGA, DVI, S-Video and two USB 2.0 ports, with modem and Gigabit Ethernet. The left panel houses the optical drive and two USB 2.0 connectors, and the right has headphone, microphone, FireWire, PC Card and SD interfaces. Bluetooth and 802.11b/g Wi-Fi are included.

Anyone familiar with notebooks would expect such high-powered componentry to add up to poor battery life, but Dell has worked some magic and managed to get the 9200 to run for over three hours under BatteryMark 4.0.1 testing. *APC* always tests battery life with the processor running at full bore, networking options turned on and the screen set to its brightest level. If you run the 9200 using its most aggressive power-saving settings, you'll get over four hours of battery life.

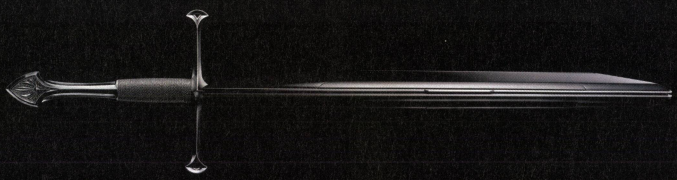
This is a top-performing desktop replacement with good battery life. It's superior to the bulky Inspiron 9100 as it's slightly smaller, lighter and runs for longer, but will only appeal to those who want an extremely powerful portable computer.

Matthew Overington

Details

Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	$3,598
Intended market	Power users, performance enthusiasts
✔	Powerful; good battery life.
✖	Large for a notebook.
Verdict	★★★★☆

Image rendered by PHOTOLINE, 600 dpi, 8 bit, Windows XP Professional, PDF Module Exemption



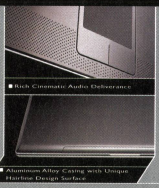
comfort: The Power of Possibilities

The Slim, Lightweight 15-inch Notebook

The ASUS V6000V is an ultra slim 15-inch notebook that is lighter than most of the 14-inch notebooks available in the market. It is characterised by a refined and elegant design that represents the most comprehensive solution that not only offers functionality but also cutting edge performance. The sleek V6000V is the modern symbol of success and pointer of style for urban elites.

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- 15"XGA/SXGA+
- ATI Mobility™ Radeon™ X600 (PCI Express)
- Bluetooth™ (optional)





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HP Business Inkjet 1200dtn

The HP 1200dtn beats the beige box blues with its airy whites and attractive curves.



HP's latest Business Inkjet 1200 comes in a number of configurations to suit various small office needs. The 1200dtn has an additional 250 sheet paper tray, increasing its capacity from 150 to 400 sheets. There's also a duplex printing unit, Ethernet networking support along with USB and Parallel.

The 1200dtn is fairly easy to operate via its simplified control panel with basic buttons for cancelling jobs, feeding paper and printing a network configuration page. More advanced settings can be made with the HP Toolbox application, and a Web server lets you determine ink levels, see how many pages have been printed and estimate the number of prints possible with the remaining ink. The automatic paper sensor helps to eliminate incorrect settings, and the auto-duplex unit means you can print out double-sided booklets without standing next to the printer and reinserting each page.

The printer has four separate ink cartridges (cyan, magenta, yellow and black) and print heads which aren't integrated into the ink cartridge units. This saves you from wasting ink if one colour runs out first, or throwing away a print head when you replace an ink cartridge. Print heads cost $58.95 each and yield 12,000 black and 24,000 colour pages, according to HP. Ink cartridges, which are intended to last 1,750 pages at 5% coverage, cost $56.95 each. Overall, the print engine has a 6,250-page duty cycle per month — quite respectable at this price.

While our test results didn't exactly match HP's quoted performance, the 1200dtn managed to print a 10-page colour and text PDF in three minutes and 36 seconds. Monochrome text documents printed at 12ppm in Draft mode and seven in Normal mode. Colour reproduction on plain and coated paper reveals smooth graduations and fine edging thanks to the 4,800 x 1,200 resolution. Black text sharpness in 1,200 x 1,200dpi mode is only slightly inferior to laser. The only letdown is the lack of a manual feed tray.

Ultimately, the 1200dtn is a well designed, easy to manage small workgroup printer. A one-year return-to-base warranty with 24-hour technical support applies.

Valens Quinn

Details

Contact	Hewlett-Packard
Online	www.hp.com.au
Phone	13 23 47
Price	$589
Intended market	Small business
✔	Separate ink cartridges and print heads.
✖	No manual feed tray; flimsy output tray.
Verdict	★★★★½

MetaPass Digital Key

MetaPass has a solution for those who have to remember hundreds of online passwords.



The curse that goes with the benefits the online world brings is remembering all those usernames and passwords. The MetaPass Digital Key provides an automated way to store and retrieve passwords for both Web sites and applications.

The device looks like any USB memory key. Its 32MB capacity is semi-consumed by a Java application and runtime that automatically launches when the key is inserted. After creating a master password for encrypting data, systems and apps are added through an easy-to-follow wizard. All you need to enter is the location of the site or program and your user details. You can then plug the key into any Windows 2000 or XP PC and use it to log in to your favourite sites automatically.

The first time a site that's been set up with the Digital Key is accessed, a box with username and password buttons appears. Drag the buttons to the appropriate login fields on the site or app and they'll be automatically completed. You're also prompted to tell the key if you'd like it to complete the details automatically when you next return to that location.

If you lose your Digital Key, the master password keeps your data safe using 448-bit Blowfish encryption. When the contents of the device were scanned, not even the database credentials could be found.

However, we found that a keystroke logger could detect the key's master password and collect any user account details when they were submitted to a site. In contrast, if the credentials were simply copied and pasted from a text file, the user details weren't logged.

While the Digital Key hits the mark functionally, usability leaves a little to be desired. For instance, the X button in the top left-hand corner of the window doesn't close the application. Rather, it locks the app so that you need to use your password to access it again. It ships with only basic documentation, but more complete user information is available at the MetaPass Web site.

Being a USB memory device, the key is potentially useful for portable storage, but its 32MB capacity is limiting. Despite its Java underpinnings, the Digital Key only works with Windows 2000, XP Home and Professional. Mac, Linux and other Windows OSes are not supported.

Anthony Caruana

Details

Contact	MetaPass
Online	www.metapass.com
Price	US599.95 (shipping US$38.48)
Intended market	Everyone
✔	Secure storage; wide application support.
✖	Not immune to keystroke logging; Windows 2000 and XP only.
Verdict	★★½☆☆

CMV CT-720D

Sub-10ms TFT panels are finally here, and CMV's offers great value.

The days of LCDs being inadequate for gamers are well and truly over, with the current wave of 8ms panels negating any pixel response issues previously encountered. The first of these to hit the *APC* Labs is the 17in CMV CT-720D.

At $459, the CT-720D represents awesome value yet still meets the needs of the prosumer, featuring both D-Sub and DVI connectors (including cabling), as well as a brightness specification of 450cm/m2, a contrast ratio of 500:1 and a pair of 2.5W speakers. Although these speakers are adequate for native Windows sounds, those planning on playing games, music or video should invest in a set of headphones or speakers, as both bass and clarity are lacklustre, particularly at high volume.

The 720D runs at a native resolution of 1,280 x 1,024 pixels — standard for a 17in TFT panel. The chassis sports a two-tone bezel inspired by Apple's iPod, and the control panel offers staple brightness, contrast and colour adjustments.

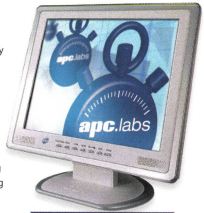
The panel was tested under varied conditions including gaming (Half-Life 2 and EverQuest 2), DVD playback, and screen quality benchmarks including DisplayMate. Gaming and DVD playback tests showed the panel to be extremely competent at reproducing fast-paced action without blurring, while DisplayMate revealed superb brightness levels and rich, vibrant colour reproduction — the most important considerations when purchasing a TFT monitor.

However, the panel did have some difficulty at the extreme ends of the colour scale, with some tan-coloured shades appearing as white and some dark purple shades appearing as black. This will probably go undetected by most consumers, but graphic designers will be disappointed.

Physical adjustments are fairly limited; users can tilt the screen slightly but not adjust the height or switch between portrait and landscape modes.

Overall, CMV has produced a panel that's a dream for fast-motion applications such as games and DVDs, but is let down slightly by minor flaws in terms of colour reproduction. At such a low price though, these flaws will be easily forgiven by all but the most demanding.

Asher Moses



Details	
Contact	Impact Systems
Phone	(02) 9621 2999
Online	www.impactsystems.com.au
Price	$459
Intended market	Everyone
✔	Low response time; DVI support; good value.
✖	Lacks height adjustment; some image quality issues.
Verdict	★★★½☆

5GB Seagate Pocket Drive

A tiny drive that provides elegant, portable storage at a reasonable price.

Advances in flash technology have put pressure on miniature hard disks used for portable storage, but Seagate has capitalised on the technology to deliver the impressive Pocket Drive. The device is tiny, measuring 7cm in diameter, and easily fits into a pocket or notebook bag.

In operation, the device couldn't be simpler; just plug the USB 2.0 connector into a spare USB port. The only hassle is the cable's length, it's barely 12cm long, so it can be tricky to connect to the motherboard-mounted USB slots found on most tower cases (the size of the device restricted Seagate from attaching a longer one). Systems running Windows Me, XP, 2000, 2003, Linux or Mac OS will pick up the drive as a removable disk and mount it like any USB flash disk. The device is host powered, so there's no messing around with power supplies or extra cables.

The unit is built around a 3,600rpm 1in hard disk. While it doesn't offer blistering performance, transfer rates of 7.4MB/s were measured during tests — fine for moving files from A to B. It would be great for a mobile computer technician, as a bootable 5GB external drive could hold common operating systems, troubleshooting tools and a solid set of drivers. It's also cushioned and Seagate claims the Pocket Drive is capable of withstanding an impact of up to 2,000G, though testing this is sure to destroy the plastic casing.

The drive comes with a software suite that helps streamline everyday tasks, including formatting the drive, setting it up as a boot disk, and locking it. These functions are available through the OS, but having them in a central utility will suit less experienced users.

Matthew Overington



Details	
Contact	Ingram Micro
Phone	(02) 9701 4500
Online	www.seagate.com
Price	$349
Intended market	Everyone
✔	Host powered; portable.
✖	Limited capacity; short cable.
Verdict	★★★½☆

Upsize your drive



Those looking for a larger portable drive may want to check out Seagate's 160GB desktop external drive. It offers both USB 2.0 and FireWire connectivity and will set you back $389.

▼ The downside: it's not host powered, and it's slightly larger than Maxtor's OneTouch USB II drive (reviewed *APC* February, page 49).

Dell Axim X50v



Dell shakes up the PDA market again with its new Axim model.

The Axim X50v sustains Dell's reputation for top-of-the-range products at mid-range prices. At 11.9 x 7.3 x 1.7cm, it's surprisingly small for such a powerful package. The 3.7in 640 x 480 display is powered by Intel's 2700g graphics chipset with 16MB of RAM. It does a great job of rendering text and graphics, especially when toggling from portrait to landscape mode to view spreadsheets and Web pages. If you plan to switch orientations regularly, this action can be assigned to one of the six hardware buttons.

Intel's 624MHz PXA270 processor powers the Windows Mobile 2003 SE operating system. Even though this is the same CPU as HP's hx4700, the X50v's overall Spb Benchmark result of 1,248 is about 25% lower. However, the Axim is also 25% cheaper.

The X50v is loaded with plenty of memory and expandability. The 64MB of RAM and 128MB of ROM leave around 150MB of usable memory, 90MB of which is non-volatile — perfect for storing important documents and system backups taken with the inbuilt utility. The slots can be used for IO devices like cameras, VGA outputs and GPS receivers.

There's no need to use the memory slots for adding communications as the X50v comes with both 802.11b Wi-Fi and Bluetooth. Networking is enhanced with the addition of the Odyssey Networking client for connecting to corporate LANs using most popular encryption and authentication standards. Bluetooth was easily configured with the Widcomm software that's common to most Pocket PCs. The IR port can be used as a universal remote control and to beam data to other devices.

For a device that does so much, the battery is a little underpowered at 1,100mAh. Running Spb Benchmark's battery test yielded a little over three and a half hours in the application test, running a series of programs in a loop. While this easily translates into a day's use under normal operating conditions, it's disappointing.

Dell has incorporated a lot of capability and expandability into a tight package. If the price tag seems steep, there are other versions with slower processors and without the VGA resolution screen. However, the Axim X50v offers excellent value.

Anthony Caruana

Details

Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	$849
Intended market	Everyone
✔	VGA screen; Wi-Fi and Bluetooth; expandability.
✖	Disappointing battery life.
Verdict	★★★★☆



HP iPAQ h6365

HP shows that you really can be all things to all people — if you're prepared to compromise.

The iPAQ h6365 isn't the first converged PDA phone, but HP has learned from O2, iMate and PalmOne. With Bluetooth, 802.11b Wi-Fi, quad band GSM and GPRS, almost all connectivity options are covered. The only compromise is the stumpy antenna, but it does make it easier to extract the h6365 from the supplied belt case.

You'd expect such a well-equipped device to feel like an unwieldy slab, but the h6365 measures a trim 14.1 x 7.6 x 2cm and is comfortable to handle. It lacks an integrated keyboard but ships with a removable thumb-board for easy data input. The 240 x 320 3.5in screen suffers from the same yellow tinge as many other iPAQs and is hard to read at some angles. HP has retained the lower resolution to help maximise battery life.

With converged devices, phone operation is critical. Speaker volume and clarity are good and toggling the phone on and off is easy. There's support for different profiles and a headset can be connected, although the jack is under an annoying rubber cover. A better option is a Bluetooth headset. The h6365 has multimedia capability in the shape of a VGA camera and supporting software. Pictures can be stored in the 57MB of user-accessible RAM or 20MB permanent filestore. The iPAQ also has a card slot that supports SDIO, SD and MMC.

HP has equipped the h6365 with a TI OMAP 1510 processor running at 200MHz. Running a low-powered CPU led to an Spb Benchmark result of 756, putting it among the slower devices in its class. In contrast, the surprising graphics score of 1,687 was almost three times that of the popular h2210.

Battery life is all-important and HP has loaded up the h6365 with a huge, removable 1,800mAh cell — *APC*'s standard MP3 loopback test with the screen at full brightness and the phone radio on ran for over ten hours. With moderate use of Bluetooth and Wi-Fi, this should mean up to three days between charges. All that's missing is a convenient battery gauge.

Overall, the iPAQ h6365 is one of the better converged devices we've tested. And while compromises have been made, they maximise battery life. However, the screen's yellow tinge is a significant issue that HP needs to address.

Anthony Caruana

Details

Contact	Hewlett-Packard
Phone	13 13 47
Online	www.hp.com.au
Price	$1,299
Intended market	Corporate
✔	Connectivity options; long battery life.
✖	Low-resolution yellow screen; slow CPU.
Verdict	★★★½☆

Because information is power

The e-STUDIO belongs to a new generation of Multi-Functional Peripherals. Developed in line with Toshiba's unique Network Ready concept, it's an all-in-one office solution with the power to satisfy all your communication needs. It also arrives with the ability to impart Internet-enhanced versatility, without time-consuming application installation.

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Hit the shops

Stay on top of product releases with *APC*'s monthly run-down of the best of the best.

Whether it's a digital camera, laser printer, PDA, notebook or Web authoring application you're looking for, here are the top picks in each category from *APC*'s staff.

The most impressive addition to this month's Best Buys list is Samsung's SyncMaster 913N panel. For years *APC* has been advising readers not to bother buying a TFT screen if you're into gaming or watching fast-paced DVDs, as the pixel response time makes for a blurred image. Though the human eye can detect movement down to around 6ms, the 8ms response time offered by the SyncMaster 913N makes any blurring extremely hard to detect. The wave of faster panels at lower prices will usher in a new era of computing, as the case for CRTs for certain users is slowly eroded.

Each state or territory has its own legislation designed to prevent consumers being mistreated by vendors or retailers, but the national *Trade Practices Act 1974* offers protection across a range of areas. It provides guidelines for warranties and sets standards for "merchantable" quality goods. It also offers protection against misleading conduct on the part of retailers. The Federal Government's online consumer portal can be found at **www.consumersonline.gov.au**.

The Australian Competition and Consumer Commission (ACCC) also offers protection to purchasers in a number of areas. It can be contacted at **www.accc.gov.au**.

Desktop systems

Dell Precision 370



Editor's Choice apc

The Precision 370 will suit engineers, digital artists and anyone who uses CAD. It features Intel's 64-bit Extended Memory Technology (EM64T) and is based on the Intel 925X chipset with 2GB of Samsung DDR-533 memory in four 512MB modules, a Seagate Barracuda 7200.7 80GB Serial ATA hard disk and a GRA-4120B DVD+RW drive. The Nvidia Quadro 128MB FX1300 video card works seamlessly with the system and provides two DVI outputs. The three-year warranty and XP Professional licence are ideal for business users.

Details	
Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	$5,299

TI AMD Deluxe 999

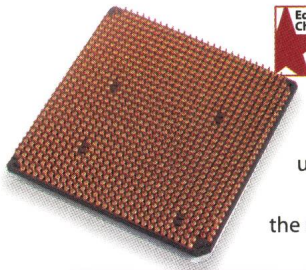
Best Value apc

The AMD Deluxe 999 is based on an Athlon 64 3000+ processor, ATI Radeon 9550 and 120GB Seagate Barracuda hard disk. There's only 512MB of RAM, but it offers fantastic performance. You'll need to factor a monitor, keyboard and mouse into the budget, though.

Details	
Contact	TI Computers
Phone	(02) 9437 5437
Online	www.ticomputers.com.au
Price	$999

Processor/motherboard

MSI K8T Neo-FIS2R/ AMD Athlon FX-55



Editor's Choice apc

The AMD Athlon FX-55 is the current performance king. It features Enhanced Virus Protection and Cool'n'Quiet technology designed to keep it running as soundlessly as possible, throttling up performance as required.

AMD has led the workstation market since the release of the first Athlon 64s, and the launch of the Athlon 64 4000+ helps maintain that position. Combined with a MSI K8T Neo-FIS2R motherboard and ample RAM, you've got one heck of a system. Throw in a 6800 GT or Ultra video card and you're laughing.

Details	
Contact	MSI
Phone	(02) 9748 0070
Online	www.msicomputer.com.au
Price	Processor, approx $1,200; motherboard, $300

ASUS A7N8X/AMD Sempron 2600+

Best Value apc

AMD's entry-level Sempron processors offer a 333MHz frontside bus and 256KB of Level 2 cache. Enhanced Virus Protection is built in and enabled by Windows XP. Combine the chip with an ASUS A7N motherboard for a powerful, low-cost base platform.

Details	
Contact	Achieva
Phone	(02) 9742 3288
Online	www.achieva.com.au
Price	$285

Notebooks

Fujitsu LifeBook S7010

Editor's Choice apc

Not everyone needs the sort of big, beefy notebook that can be used for watching TV, playing games, or working on large-scale architectural plans. Fujitsu's LifeBook S7010 weighs in at less than 2kg with a 14in 1,024 x 768 pixel screen, 1.7GHz Pentium M processor and full Centrino spec. A DVD Super Multi Drive is fitted, along with 512MB of RAM and an 80GB hard disk, making the unit ideal for the busy exec.



System administrators will also appreciate the LifeBook's support for Trusted Platform Module, as it allows for hardware-level security implementations. A desktop port replicator is available for $249.

Details	
Contact	Fujitsu
Phone	1800 288 284
Online	www.lifebook.com.au
Price	$4,499

Acer Aspire 1680

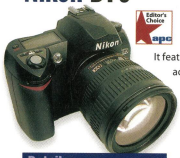
Best Value apc

The Acer Aspire 1680 features a 1.5GHz Pentium M processor, a 15in wide-screen display running at 1,280 x 800 pixels, 4x DVD±RW drive and 60GB hard disk. The base RAM is meagre at 256MB, but you can always add more. At around 3kg, this machine doesn't feel like dead weight.

Details	
Contact	Acer
Phone	www.acer.com.au
Online	1300 366 567
Price	$2,699

Digital cameras

Nikon D70



The 600g Nikon D70 offers a 6.1 megapixel CCD and 0.13 second shutter response time. It features a Nikkor F mount which accepts a wide range of Nikon lenses, including regular G or D AF-type SLR lenses. The 18–70mm lens bundled with the camera offers aperture ranges from f/3.5 to f/4.5.

The camera resembles an SLR and offers the same range of settings. Users have a choice of fully automatic or a range of scene modes. Bracketing and a selection of shooting modes are supported, including single frame, 3fps and a self-timer.

Details	
Contact	Maxwell
Phone	(02) 8748 5200
Online	www.maxwell.com.au
Price	Body, $1,999; D70/AF-S with 18–70mm DX lens, $2,299

Olympus Camedia C-5060

The 5.1 megapixel C-5060 is hard to go past. The Camedia's 27–110mm 4x zoom lens offers a wide-angle and a super macro mode, and it's reasonably fast with an f/2.8 to 4.8 aperture. A variety of shot, meter, focus, white balance, exposure and image file modes are also available.

Details	
Contact	Olympus
Phone	1300 659 678
Online	www.olympus.com.au
Price	$1,099

ADSL modem/routers

DrayTek Vigor2600G



One of the most feature-rich ADSL modem routers on the market, the Vigor2600G is primed for business. The device supports up to 16 simultaneous PPTP, IPSec and L2TP VPN connections using DES, 3DES or AES encryption schemes, making it compatible with most enterprise firewalls. SNMP support is also included, along with Dynamic DNS, DMZ, VLAN, RADIUS support, SSID hiding, 128-bit WEP and WPA support.

Rounding out the feature pool is 54MB Wi-Fi, making the DrayTek modem router a complete solution for getting your wireless, Internet-enabled home network up and running securely.

Details	
Contact	DrayTek Australia
Phone	1800 617 711
Online	www.draytek.com.au
Price	$349

Belkin F5D7630au4A

The F5D7630au4A is one of the best value all-in-one routers available today. Superb out-of-the box functionality, SSID hiding, WPA-PSK and 128-bit WEP wireless security features are all offered. Sadly, there's no print server capability or line filter in the retail box.

Details	
Contact	Belkin
Phone	1800 666 040
Online	www.belkin.com.au
Price	$300

TFT screens

Samsung SyncMaster 913N



Samsung's latest 19in TFT panel resets the standard for computer displays. The svelte unit boasts an 8ms pixel response time, currently the fastest on the market, and runs at a native resolution of 1,280 x 1,024 pixels.

DisplayMate testing shows excellent contrast, brightness and colour balance, and the automatic adjustment feature works well.

The SyncMaster is the ultimate monitor for all-round use, being equally well suited to gaming, watching DVDs or mundane office duties. A comprehensive range of options for inputs and an excellent dead pixel policy help make Samsung the premier supplier of TFT panels in Australia.

Details	
Contact	Samsung
Phone	1300 369 600
Online	www.samsung.com.au
Price	$999

Gigabyte GD-1903DP

The Gigabyte's design is simple yet attractive and its performance is outstanding, especially in the area of tone differentiation. There are small built-in speakers and a range of connections, while the 25ms response rate makes the Gigabyte ideal for most office uses.

Details	
Contact	Rectron
Phone	(02) 9748 7725
Online	www.rectron.com.au
Price	$699

PDAs

HP iPAQ hx4700



Sporting a powerful 624MHz CPU, 138MB of available memory and big VGA screen, the hx4700 has brains and brawn. Both Wi-Fi and Bluetooth feature, while future expansion is taken care of with CF and SD slots. The impressive software bundle adds Westtek's ClearVue PDF and PowerPoint viewers and Web Information Solutions' Pocket Informant to the Windows Mobile 2003 SE OS.

The clear, crisp VGA screen is better than any we've seen in the *APC* Labs so far. Switching to landscape orientation for spreadsheets and Web sites ensures comfortable viewing and reduces scrolling.

While the price puts the hx4700 among the most expensive PDAs, it's a Rolls-Royce in a Commodore field.

Details	
Contact	HP
Phone	13 13 47
Online	www.hp.com.au
Price	$1,199

Dell Axim X30 Basic

Designed for the first-time or light PDA user, the X30 Basic is good value. The Intel XScale 312MHz processor is adequate, while the 32MB of user-accessible memory is plenty for PIM use and a few apps. The SDI/O slot can be used to add Wi-Fi, Bluetooth or more storage.

Details	
Contact	Dell
Phone	www.dell.com.au
Online	1300 303 107
Price	$399

External hard disks

Maxtor OneTouch II USB



Editor's Choice apc

Quite simply, a PC can never have enough storage, so adding an external drive is the perfect way to increase capacity or facilitate the transfer of huge files. Maxtor's OneTouch USB impresses with its supplied backup software which can copy precious data to the drive with a single press of a button. Performance is stunning, and the drive is available in capacities up to 300GB.

The Maxtor is solidly built for a portable device, so little accidents shouldn't cause problems. And if you require more than one, the cleverly inversed patterns on the drive's top and bottom let you stack them safely.

Details

Contact	Maxtor
Phone	(02) 9369 3662
Online	www.maxtor.com
Price	250GB, $499

5GB Seagate Pocket Drive

Sometimes portability outweighs the convenience of having hundreds of gigabytes of storage space in an external drive. Advances in miniature hard disks have led to Seagate's impressive 5GB pocket drive. The entire USB 2.0 unit measures 7cm in diameter and easily fits into a pocket.

Details

Contact	Ingram Micro
Phone	(02) 9701 4500
Online	www.seagate-asia.com
Price	$349

Internal hard disks

Seagate Barracuda 7200.7



Editor's Choice apc

One of the changes the new PC chipsets, including Intel's 9xx range and Nvidia's nForce 4, bring to the table is support for Serial ATA Native Command Queuing. This allows controllers and drives to group read requests to optimise how data is read from the drive.

Seagate's new Barracuda 7200.7 drives support this feature, leading to impressive performance boosts when used with current-generation motherboards. Just throw a couple into a modern machine for a seriously quick (and relatively inexpensive) disk system. Though it may sound like overkill to run a RAID array in your home PC, the low cost of these drives means server-level disk performance is now within everyone's reach.

Details

Contact	Seagate
Phone	(02) 9748 7430
Online	www.seagate-asia.com
Price	120GB, $165; 160GB, $185

Western Digital WD1200JB

If you're lagging behind and haven't opted for a system with support for Serial ATA drives yet, the best bet for adding extra storage to your machine is a Western Digital IDE drive. The JB line includes an 8MB cache, which speeds burst transfers of data, backed by a three-year warranty.

Details

Contact	Westan
Phone	(03) 9541 8888
Online	www.westan.com.au
Price	120GB, $139; 160GB, $175

Optical drives

Sony DRU710A

Editor's Choice apc

The DRU710A from Sony is the new speed king in the *APC* Labs, capable of burning DVD+R media at 16x, DVD-Rs at 12x and Double Layer disks at 4x with a free firmware upgrade from the Sony Web site. Beating the previous incumbent, the Pioneer DVR-A08XL drive, by a full minute, the DRU710A burned a test disk in five minutes and 47 seconds. CD-R writing is supported at 48x, writing a full disk in two minutes and 53 seconds, and CD-RW at 24x.



The small size means those with tight-fitting cases will have more room. Bundled with Nero 6 OEM, a replacement black face plate and an IDE cable, the DRU710A is both fast and well appointed.

Details

Contact	Sony
Phone	1300 138 246
Online	www.sony.com.au
Price	$179

Samsung TS-H492A

The CD-RW is still a hot commodity at the budget end of the market. The TS-H492A combines a 52x CD-R, 32x CD-RW drive with a 16x DVD-ROM for "best of both worlds" performance. It also has Ahead's Nero 6.0 for burning CDs and CyberLink's PowerDVD 6.0 for watching movies.

Details

Contact	Samsung
Phone	1300 369 600
Online	www.samsung.com.au
Price	$99

Printers

HP Photosmart 2710

Editor's Choice apc

Photo printing direct from memory cards or a digital camera with PictBridge, colour faxing at 33.6Kbit/s, high-quality scanning and colour photocopying — sounds like a dream machine that would cost the earth. Wrong! The HP 2710 is a quality photo printer with all of the above, plus a handy 3in LCD panel to select photos. A Wi-Fi print server and Ethernet port also feature.



At around 10 cents per page for monochrome, a laser printer is better value if you only print plain text, but the flexibility of the multifunction device, combined with the stunning quality photo printouts, makes the 2710 the ideal home printing solution.

Details

Contact	HP
Phone	13 13 47
Online	www.hp.com.au
Price	$699

Canon Laser Shot LBP 3200

If you're after a high-quality, inexpensive personal laser printer for a Windows machine, it's hard to go past Canon's Laser Shot LBP 3200. The unit can handle a 20-page document in 85 seconds and while it's not the cheapest to run, the low purchase price puts it ahead of the competition.

Details

Contact	Canon
Phone	1800 021 167
Online	www.canon.com.au
Price	$349

Video cards

Gigabyte Nvidia GeForce 6800GT

Editor's Choice apc

Nvidia's 6800GT is the current best all-round performer in the video card market. Labs testing produced a result of 9,812 in 3DMark2004, showing it to be a top performer in the latest games and perfect for video editing and multimedia applications.



If you're a dedicated gamer, and you'll need to be to fork out $999 for a video card, you can't go past the Nvidia GeForce 6800GT. The excellent Thief 3 and Joint Operations: Typhoon Rising are bundled with the card, showing off its abilities. The card's Pixel Shader 3.0 support in DirectX9.0c and high dynamic range lighting bring a new level of detail to 3D environments.

Details	
Contact	Synnex
Phone	1300 880 038
Online	www.synnex.com.au
Price	$999

ABIT ATI Radeon X300 SE-Guru

In this case, the budget price tag doesn't mean low value. Besides its top performance, ABIT's card stands head and shoulders above the rest of the cards in the X300 range thanks to the inclusion of the company's proprietary vGuru overclocking technology.

Details	
Contact	Altech
Phone	(02) 9735 5655
Online	www.altech.com.au
Price	$176

Internet security software

Zone Labs ZoneAlarm Security Suite

Editor's Choice apc

Antivirus has been added to the latest release of ZoneAlarm, now making it a fully fledged Internet security suite — and the customary 12 months of updates are included in the price. Other new features include fraud protection, instant messaging content limiters and Web filtering (parental control).



It remains one of the easiest firewall apps to use, but also has enough advanced tools to keep the paranoid comfortable. Customisable program blocking allows fine control over which apps can access the Internet and which ports are open.

Details	
Contact	Secure Tec
Phone	(03) 9755 5314
Online	www.zonelabs.com.au
Price	$99.95

Sygate Personal Firewall Pro

There are no excuses for having an unprotected system. Sygate's Personal Firewall Pro blocks both unauthorised outbound communications and attacks from external users. It also features a detailed management application that generates network statistics on a per-application basis.

Details	
Contact	Sygate
Online	www.sygate.com
Price	US$56

Web authoring software

Zend Studio 3.5

Editor's Choice apc

Zend Studio is the complete integrated development environment for rapid application development using the PHP language. While the Studio client is enough to create powerful PHP applications, the server component passes debugging information back to the client, providing a more thorough and comprehensive development environment. The application's interface is clean and easy to use, allowing you to get on with coding.



If you're working as part of a group, Studio 3.5 supports remote team environments and code management via CVS. Strong auto-completion wizards make repetitive coding tasks easier and more efficient.

Details	
Contact	Zend
Online	www.zend.com
Price	US$249

TSW WebCoder 5

You don't have to fork out big bucks for a powerful and intuitive HTML authoring package. WebCoder 5 has much of the functionality you'd expect from an HTML editor including coloured syntax, built-in FTP client, CSS inspector, validation tools and more. Best of all, it has a familiar and easy-to-use interface.

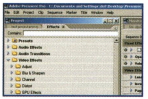
Details	
Contact	Tanggard SoftWare
Online	www.tsware.net
Price	Free

Video editing software

Adobe Premiere Pro 1.5

Editor's Choice apc

Whether you're putting together a simple home video or preparing a professional presentation, it's reasonably straightforward with Adobe's Premiere Pro. It's easier to learn to use than many of its competitors, and with support for multiple video streams and a raft of effects, you can use it to turn even a shaky, low-quality clip of a day at the beach into a Hollywood masterpiece.



Compatibility with Adobe After Effects plug-ins for video and VST plug-ins for audio let you keep the store of effects fresh. Support for editing and output in 16:9 as well as 5.1 audio mixing let you work like the pros. Be warned: Premiere can bring even the most powerful of processors to its knees when working with hefty files or multiple effects.

Details	
Contact	Adobe
Phone	1300 550 305
Online	www.adobe.com.au
Price	$1,499

Avid Free DV

There's no better price than free, and there's no more powerful video editing software than Avid. Get a step up into the Avid product family without forking out thousands for the software. It only supports QuickTime and DV-AVI at this level, but for a free app, you can hardly complain.

Details	
Contact	Avid
Phone	www.avidaustralia.com.au
Online	1800 655 945
Price	Free

Sub-$2,000 PCs

How we tested

Performance isn't everything in this roundup. Factors assessed include hardware specification, software package, monitor size and type, flexibility, connectivity, warranty and build quality. Systems with acceptable hardware specs, software bundles and speed rate better than faster systems without well-rounded features.

All these systems were subjected to a rigorous suite of benchmark applications.

Gaming suitability and 3D video card performance were tested with FutureMark's 3DMark01 SE Pro for DirectX 8 performance, 3DMark03 for DirectX 9 performance and Bungie's Halo for PC for real-world results. The 3DMark benchmarks were run in 1,024 x 768 with no anti-aliasing and 4x anisotropic filtering, while Halo was tested using the built-in timedemo function at 800 x 600 with standard video settings using Pixel Shader 2.0 and V-Sync turned off.

All systems were run through VeriTest's Business Winstone 2004 to effectively guage how suitable they are for business productivity in Word, Excel and Frontpage.

Multimedia Content Creation Winstone 2004 tests the PCs' ability to handle multimedia tasks involving Adobe Premiere, Photoshop and Sony Sound Forge, and provides an accurate, repeatable score for the system's abilities in this power-hungry area.

Lastly, PCMark04 tests RAM, video, disk and CPU functions to give an overall assessment.

Two grand buys a lot of PC these days. *Nick Race* and *Asher Moses* run eight through their paces.

Though PCs under $1,000 have been available for a year, they've only had enough grunt to take on basic tasks like Web browsing and word processing.

For this roundup, vendors were asked to submit sub-$2,000 systems designed for PC users who want gaming, multimedia (DVD movies, music), photo editing and broadband functionality. Since last year's PC megatest (*APC* June 2004, page 80), low-cost machines have become more powerful and flexible. These low-cost systems have CPU speeds at around the 3GHz mark and memory from 512MB up to 1GB, meaning they can easily handle video editing and gaming. Higher end video cards are now standard, and all but one hard drive in this roundup are 120GB or bigger.

Six of the eight systems tested here include an LCD monitor, compared to only four of the 12 reviewed last June. Vendors who submitted CRTs in this roundup chose them for the advantages they offered for gaming. Of course, some things are left out at this price: only one system includes a standalone soundcard over an onboard solution, while performance RAID configurations are still nowhere to be seen.

There's one major point to keep in mind when purchasing a low-cost machine — how easily can it be upgraded? Purchasing a machine at low cost and planning to upgrade it later can often be problematic, as chipsets, sockets and standards that are due to be phased out are often used. When buying one of these systems, aim for newer technology, even if you need to settle for a lower specced machine.

For example, while a low-cost socket 478 Pentium 4 motherboard and CPU is currently well priced, in 12 to 18 months' time a compatible upgraded CPU is going to be difficult to track down. Try to find a socket 775 for Pentium 4 processors, or socket 939 for Athlons, where upgraded processors will continue to be released until the next major motherboard refresh.

Sub-$2,000 PCs – then and now

Then/now	APRIL 2004 PC MEGATEST $1,000–$1,999	MARCH 2005 SUB-$2,000 LABS CHALLENGE
Video card 	Video cards were either Nvidia FX series or ATI 9000 series, capable of sub-10,000 results in 3DMark01. Radeon 9800 series cards still feature in the current roundup.	Current-generation video cards are included, such as Nvidia Series 6 and ATI X Series. Some score almost double the ratings of the April 2004 systems.
CPU 	Processors ranged from 2.8GHz or equivalent up to 3.2GHz, based mainly on the Intel 865PE chipset.	CPU speeds haven't increased much. However, a larger selection of chipsets are featured — nForce 3 for AMD, and 915 and 865PE for Pentium 4s.
Monitor 	Only four of the 12 systems included LCD monitors. Refresh rates were around 20ms — not too great for gamers. CRTs were bundled to keep packages under budget.	Six of the eight systems have sub-20ms LCD monitors — much better for gaming and video use. CRT monitors were included with gaming-oriented machines.
Hard drive 	The hard drive capacity *du jour* was 80GB, with the odd exception.	All systems except one have a minimum hard drive capacity of 120GB.

Acer Aspire T620



The Acer Aspire T620 is a combination of mid-range hardware with a very strong software package that includes Windows XP Home, Microsoft Works 8.0 for productivity tasks, Webster's Encyclopedia, Acer's eConsole for music, Aspire FM for radio playback, Aspire TV for TV playback and recording, NTI DVD+CD Maker Gold for backing up data and video, as well as CyberLink PowerDVD 5.0 for DVD playback. Three games are also included.

The Radeon X300SE video card is a budget PCI Express model suitable for entry-level gaming. It could only muster 28.71fps in Halo, the third-lowest score. Both 3DMark scores were near the bottom of the pile too, with 6,567 points in 3DMark01 SE Pro and 1,810 in 3DMark03. However, the T620 fared much better in other tests, charging through the Business Winstone 2004 productivity benchmark with a top score of 21.6. The Aspire also had the second-highest Multimedia Content Creation score (27.7) and the third-highest PCMark04 score (4,400).

Other positives include the Gigabyte GA-8I915P-MF motherboard using the Intel 915 chipset, ensuring upgradeability for some time. Digital camera enthusiasts will love the built-in card reader and FireWire connectivity for digital video. The 120GB hard disk drive is standard, though not the highest in this roundup, and the OptoRite 16x DVD±RW DL is good. And like the Dell Dimension 4700, it includes a 56K PCI modem. Although the supplied monitor is an LCD, it's only 15in.

Overall, the Acer is a very good performer with a strong software package.

Details

Contact	Acer
Phone	1300 366 567
Online	www.acer.com.au
Price	$1,999
✔	Great software package; good all-round performance.
✖	Low-end video card; 15in monitor.
Verdict	★★★★☆

Adelong Black Widow



Despite its name and striking appearance, complete with cold-cathode light, the Adelong Black Widow's performance couldn't quite match its looks. Business and Content Creation Winstone scores were lacklustre (20.5 and 26.5 respectively), in addition to the second lowest PCMark04 score at 3,420. This is likely due to the combination of the machine's 3GHz P4 processor, low-end FX5700-based graphics card and the fact that the 120GB Western Digital is the only IDE hard drive in the roundup.

Overall gaming performance was respectable, though it didn't come close to that of the Altech, Emagen or PC Quest systems. The Black Widow achieved average scores in both 3DMark03 and Halo, with 3,044 and 38.45fps respectively. The older 3DMark01 SE Pro benchmark clocked the machine at a middle-of-the-road 11,676 points.

However, the Black Widow does have some redeeming features such as a Pioneer 108BK 16x DVD±RW, a BenQ FP737 17in LCD monitor with gamer-friendly 16ms response time, and a software bundle consisting of Windows XP Professional, Norton Internet Security 2004, Ulead Video Studio 7 and InterVideo WinDVD, but no games.

Satisfactory connectivity options (both USB 2.0 and FireWire) round out the package, but these do little to negate the disappointment caused by poor performance and the fact that there are no distinguishing features such as a TV tuner or card reader. A generous one-year onsite or three-year return-to-base warranty is included.

Details

Contact	Adelong
Phone	(02) 9260 3188
Online	www.adelong.com.au
Price	$1,965
✔	Unique design; solid software bundle.
✖	Poor performance; no standout features.
Verdict	★★★☆☆

Altech Gameforce Warrior



The speed of this machine, coupled with its plethora of features and decent software, make for a strong package. Both test and real-world performance is head and shoulders above the competition, the software bundle is superior, and the high-quality 19in LG Flatron T910B CRT monitor is a bonus.

While it lacks a card reader, TV tuner and Gigabit Ethernet support, its powerful 3.2GHz Pentium 4 processor, GeForce 6800 graphics card, 160GB hard disk and dual channel memory configuration made this the second-highest performing gaming machine (Emagen's Vitesse 64 3000+ blitzed the competition in this regard), and the overall best performing system in terms of multimedia and business applications. The Gameforce's 3DMark03 and Halo scores were impressive at 9,193 and 69.3fps respectively, while its Multimedia Content Creation Winstone and PCMark04 scores of 29.6 and 5,107 were phenomenal for such a low-cost system.

Altech's software bundle has catered for both the gaming and multimedia crowds, including Windows XP Home, ArcSoft Video Impressions, PowerDVD, PowerProducer Gold, Ahead Nero Express, Raven Shield and Tomb Raider: AoD.

Hardware is also well rounded, with an Auditek 1200W 5.1 speaker system which thumps out thundering bass at the sort of volume even high-end machines will struggle to match. A two-year return-to-base warranty is also included. The only major improvements could be the addition of more FireWire ports (it only has one), a card reader and an even bigger capacity drive.

Details

Contact	Altech
Phone	(02) 9735 5655
Online	www.altech.com.au
Price	$1,995
✔	Stunning performance; great software bundle.
✖	No card reader, TV tuner or Gigabit Ethernet.
Verdict	★★★★½



Details

Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	$1,699
✔	Dedicated soundcard.
✖	Onboard graphics; small hard drive; no DVD burner; weak software bundle.
Verdict	★★☆☆☆

Dell Dimension 4700

The Dimension 4700 was disappointing considering the past performance of Dell machines, such as the Precision 370 workstation (*APC* January, page 44) in recent roundups. The Dimension 4700's specs aren't too far off the pace — a Pentium 4 3.2GHz and 512MB of PC3200 RAM on a Dell 915-based motherboard are a good start. The package also includes a 17in Dell E173FP LCD panel, and it's one of only two systems here with a 56K PCI modem.

However, things go downhill after that with an inadequate 40GB hard disk, 48x CD-RW/DVD ROM (the only system here without a DVD burner) and no FireWire ports. There's no card reader either.

Benchmark results were poor. PCMark04 clocked the machine fourth with 4,056, due to the PC's reasonable processor and RAM combination, but it fell down under graphically intense testing. The Dimension 4700 achieved the lowest score in four of the six benchmarks: 5,379 in 3DMark01, 1,363 in 3DMark03, 18.9 in Business Winstone and an average of 20.77fps under Halo. Multimedia Content Creation Winstone scored the 4700 at 26.7 — not a bad result thanks to the processor, but it's still short of the other scores.

Most of these results can be attributed to the machine's reliance on onboard graphics, though thankfully a 16x PCI Express slot is available for adding next-gen video cards.

Windows XP Professional, DVD Software Decoder and Sonic RecordNow! were the extent of the software package — a big letdown from a company that's usually a strong contender.



Details

Contact	Emagen
Phone	1300 880 070
Online	www.emagen.com.au
Price	$1,999
✔	Best gaming performance.
✖	No card reader or TV tuner; poor software bundle.
Verdict	★★☆☆☆

Emagen Vitesse 64 3000+

Gaining top scores in the gaming benchmarks — 19,405 and 11,351 in 3DMark01/03 and 79.7fps in Halo — the Emagen Vitesse is ideal for gamers. However, the testing criteria listed multimedia features and software bundle as two important aspects, and the Vitesse scored less well there.

The machine's superior gaming performance is due to its GeForce 6800GT graphics card. But its concentration on gaming means it's deficient in other areas. It was beaten by the Altech Gameforce Warrior and Acer Aspire T620 in both the Business/Multimedia Content Creation Winstone tests (scores of 20.8 and 26.3 respectively), and its PCMark04 score of 3,894 puts it near the bottom of the list.

The Vitesse's feature set also suffers in comparison to the other PCs in the roundup. The Athlon 64 3000+ processor and 120GB hard drive don't stand out from the crowd, and there are no speakers or card reader. The software package is lacklustre — only Windows XP Home, InterVideo WinDVD 5 and Ahead Nero are bundled.

The Pioneer 16x Double Layer DVD±RW drive is one redeeming multimedia feature, though the 17in Mitsubishi CRT monitor is unable to compete with the Altech's 19in CRT or the 17in LCD panels boasted by the other systems. The one-year parts and labour warranty isn't the most attractive here either.

When it comes to gaming, the Vitesse leaves all the other systems in its wake. However, for functions such as multimedia and photo/DVD editing, it doesn't offer the same quality feature set as the other systems in this Labs Challenge.



Details

Contact	PC Quest
Phone	1300 550 118
Online	www.pcquest.com.au
Price	$1,999
✔	200GB drive; strong overall performer.
✖	Lacks DVD authoring/editing.
Verdict	★★★★☆

PC Quest Turbo X

PC Quest knows how to put together a high-performance machine. Though the Turbo X didn't gain the highest score in any of the benchmarks, the system was consistently among the best.

A Pentium 4 3.2GHz processor paired with two 512MB sticks of Kingston RAM power it on an ASUS P5P800 motherboard. This helps the Turbo X reach the second-highest Business Winstone and Multimedia Content Creation scores (21.5 and 27.1 respectively). A last-generation GeCube Radeon 9800 Pro propels the PC Quest machine to second place in 3DMark01 SE Pro with 18,705, though it slips slightly to third in 3DMark03 with 6,033 marks.

Inside, a 200GB Seagate hard drive offers plenty of storage, while the Lite-On 16x DVD±RW drive burns DVDs in minutes. It can't read or write to memory cards for digital cameras, but it does have four FireWire ports — more than any of the others.

A BenQ T701 17in LCD monitor easily beats the Acer Aspire T620's puny 15in model, and it also includes Gigabit Ethernet. Windows XP Home is installed, along with InterVideo WinDVD, Ahead's Nero OEM pack and Counter-Strike: Condition Zero. The inclusion of a digital video editing or DVD authoring package would make the large hard drive and DVD burner more useful.

The Turbo X beats the Pioneer DreamVision in benchmark testing and has a superior software package. Despite the fact that the Turbo X has the biggest hard drive and the most FireWire ports, the Altech Gameforce Warrior is a better system with stronger overall benchmarks and software.



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Pioneer DreamVision



The Pioneer DreamVision is a well-rounded system let down by a lacklustre software package. Overall performance is good, and it scored the third-highest Multimedia Content Creation Winstone score of 27.4, though it was third from the bottom of the pile in PCMark04 with 3,761.

While many vendors opted for a 3.2GHz Pentium 4 processor and mid-range graphics cards, Pioneer's choice of a Pentium 4 530 3GHz CPU is one reason for this PC's relatively poor gaming performance, compounded by the soon-to-be-discontinued X600 Pro-based graphics card.

As a result, gaming performance is no match for the Altech Gameforce Warrior or Emagen Vitesse 64 3000+, with mid-range scores in Halo (37.18fps) and 3DMark01 (10,829). This is adequate for casual gamers, but don't expect smooth frame rates or immaculate image quality in titles such as Half-Life 2 and Doom 3.

The Pioneer DreamVision includes a Seagate 120GB hard drive, card reader, a Polyview PT-725A 17in LCD monitor and speedy Pioneer DVR108 Double Layer DVD±RW drive. There's also a Creative FPS1600 speaker system which is adequate, but not as good as the Altech's Auditek 1,200W 5.1 set. The software bundle is poor, with only Windows XP Home and Norton Internet Security 2004 included.

This PC is very similar to Adelong's Black Widow, but the Pioneer's overall test results, hardware (SATA drive, two FireWire ports, card reader and speakers), and one-year onsite plus three years' labour RTB warranty make this a more rounded system.

Details

Contact	Pioneer
Phone	(02) 9690 2888
Online	www.pioneercomputers.com.au
Price	$1,999
✔	Card reader; overall hardware spec; performance.
✖	Poor software bundle.
Verdict	★★★½☆

Plus Corp Aspect MC75



Despite Plus Corp's respectable all-round hardware specs, the Aspect MC75 crumbled in the *APC* Labs. Ordinary results can sometimes be overlooked, but this system only eked out 3,234 in PCMark04 — the lowest in this roundup. The solitary stick of 512MB RAM doesn't help, as it can't use the speed increase offered by the dual channel memory bus.

Gaming is handled by a 128MB XpertVision Radeon 9600SE video card — not the latest and greatest by any stretch, and it struggles to keep up in modern games. The graphics scores were the second-lowest across the board, with a 3DMark01 score of 6,162, 3DMark03 score of 1,702 and an average of 27.74fps in Halo.

Although there are serious performance issues, the operating system sets the Aspect MC75 apart. The inclusion of Microsoft Windows XP Media Center Edition 2005 was the biggest surprise, and it's also the only system with a TV tuner. The 17in BenQ LCD FP737s-D monitor is a bit small for the lounge room, but it's just fine as a separate television for the kids. The nForce3 250 chipset incorporated into the Gigabyte GA-K8NS Athlon 64 2800 motherboard also has a built-in Nvidia Hardware Firewall.

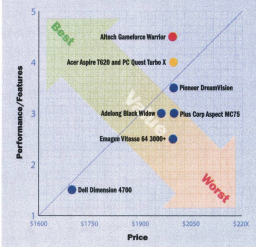
In addition to Windows Media Center, the MC75's software bundle includes FarCry and Counter-Strike: Condition Zero, plus Ahead Nero OEM, Ulead Photo Studio and Norton Internet Security.

Overall, the Plus is a nice package, although its poor test results, lack of FireWire, card readers and Dual Layer DVD, and limited one-year onsite warranty keep it from getting a higher rating.

Details

Contact	Plus Corp
Phone	1800 007 587
Online	www.pluscorp.biz
Price	$1,895
✔	Windows XP Media Center 2005; TV tuner.
✖	Older 3D card; poor benchmarks.
Verdict	★★★☆☆

apc price-to-performance ratio



Picking an Editor's Choice was a tough call. In the end, the Altech Gameforce Warrior took the award, thanks to its superior hardware, solid software package and better overall benchmark results than its nearest competitors. With a great GeForce 6800 video card for 3D games, it should have enough staying power to keep it current for a while to come. As a result, Altech's system is also hard to beat for value.

The only quibbles some might have concern the lack of a memory card reader and the bulk of the 19in CRT monitor. Gamers, however, will disagree as the response time is faster than 20ms-plus LCD monitors.

If it's a flat screen you're after, both the Acer T620 and PC Quest Turbo X machines are well-rounded systems. While behind the Altech in testing, both were adequate and offer a strong mix of hardware and software.



Editor's Choice March 2005 apc

Sub-$2,000 PC specifications

				★ Editor's Choice				
Vendor	**Dell Dimension 4700**	**Plus Corp Aspect MC75**	**Adelong Black Widow**	**Altech Gameforce Warrior**	**Acer Aspire T620**	**Emagen Vitesse 64 3000+**	**PC Quest Turbo X**	**Pioneer DreamVision**
Price	$1,699	$1,895	$1,965	$1,995	$1,999	$1,999	$1,999	$1,999
Warranty	1-year limited onsite	1-year onsite limited hardware warranty	1-year onsite or 3-year RTB	2-year RTB	1-year onsite	1-year parts and labour onsite	1-year parts, 5-year labour RTB	1-year onsite, 3-year labour RTB
CPU type/speed	Pentium 4 3.2GHz 1MB	AMD Athlon 64 2800	Intel Pentium 4 530 3GHz	Intel Pentium 4 540 3.2GHz	Pentium 4 3.2GHz 1MB	AMD Athlon 64 3000+	Pentium 4 3.2GHz 1MB	Intel Pentium 4 530 3GHz
Motherboard	Dell E210882 – Intel 915G	Gigabyte GA-K8NS nForce3	Gigabyte GA-81PE775P, i865PE	ABIT AS8-3RDEYE, i865PE	Gigabyte GA-8I915P-MF – Intel 915P	ASUS K8V SE Deluxe, VIA KT800	ASUS P5P800 – Intel 865PE	Gigabyte GA-81915GMF, i915
RAM (as tested)	2 x 256MB	1 x 512MB	1 x 512MB	2 x 256MB (dual channel)	1 x 512MB	1 x 512MB	2 x 512MB	1 x 512MB
Memory type/speed	PC3200	PC3200	PC3200	PC3200	PC3200	PC3200	PC3200	PC3200
Soundcard (make/model)	SoundBlaster Live! 5.1	Realtek ALC850 integrated	Realtek onboard AC97	Realtek onboard AC97	Intel HD audio	6-channel onboard	SoundMAX integrated	Realtek onboard AC97
Hard disk and capacity	40GB	Seagate 7200.7 160GB	Western Digital 120GB 7,200rpm, 8MB buffer	Maxtor 160GB, 7,200rpm	Seagate 7200.7 120GB	Western Digital 120GB, 7,200rpm	Seagate 7200.7 200GB	Seagate 120GB, 7,200rpm
UDMA type	SATA	SATA	UDMA/IDE	SATA	SATA	SATA	SATA	SATA
CD-ROM	48x CD-ROM	✖	✖	✖	✖	✖	✖	✖
DVD-ROM/DVD ± RW	48x CD-RW/ DVD-ROM	Sony DWU18A10B DVD±RW	Pioneer 108BK 16x DVD±RW	LG Double Layer 16x ± RW/RAM	OptoRite 0405 DVD±RW	Pioneer 16x Double Layer DVD±RW	Lite-On SHOW-16335 DVD±RW	Pioneer DVR108 Double Layer DVD±RW
Floppy disk drive	1.44MB	1.44MB	1.44MB	1.44MB	✖	1.44MB	1.44MB	1.44MB
3.5in floppy slots	1	2	1	2	2	1	2	2
5.25in floppy slots	2	4	5	4	2	5	4	4
USB ports	8	8	8	6	6	6	8	6
PS/2 ports	2	2	2	2	2	2	2	2
FireWire	✖	✖	1	1	✖	2	4	2
TV/video out	✖	Yes	S-Video	S-Video	S-Video	S-Video	S-Video	S-Video
Modem	56K PCI v.92	✖	✖	✖	56K PCI v.92	✖	✖	✖
Network	10/100 Ethernet	10/100 Ethernet	10/100 Ethernet	10/100 Ethernet	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet	10/100 Ethernet
TV tuner	✖	Dvico DVB-T Plus Digital Terrestrial TV/Capture Card FusionHDTV	✖	✖	✖	✖	✖	✖
Screen	Dell E173FP 17in LCD	BenQ FP-737S-D 17in LCD	BenQ FP737s-D 17in LCD	LG Flatron T910B 19in CRT	Acer 1521 Multimedia 15in LCD	Mitsubishi 17in CRT	BenQ T701 17in LCD	Polyview PT-725A 17in LCD
Maximum resolution	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,600 x 1,200	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024
Graphics controller	Onboard Intel GMA900	XpertVision Radeon 9600SE	Leadtek A360 FX5700	Elsa Gladiac FX940 GeForce 6800	Radeon X300 SE	GeForce 6800 GT	GeCube Radeon 9800 PRO	Gigabyte X600 Pro PCI Express
Graphics memory	64MB	128MB	256MB	128MB	128MB	256MB	256MB	128MB
Keyboard	Dell QuietKey	Microsoft basic keyboard	Tsunami Black	Microsoft Value Desktop	Acer keyboard	Microsoft Value Desktop	Logitech basic	Logitech Internet
Mouse	Dell 2-button wheel	Microsoft basic optical	Tsunami Optical	Microsoft Value Optical	Acer optical	Microsoft Value Optical	Logitech optical	Logitech optical
Software	Windows XP Pro, DVD Software Decoder, Sonic RecordNow!	Windows XP Media Center Edition 2005 Edition, FarCry, Ahead Nero, Ulead Photo Studio, Counter-Strike: Condition Zero, Norton Internet Security 2004, Fusion HDTV software	Windows XP Professional, Norton Internet Security, Ulead Video Studio 7, InterVideo WinDVD	Windows XP Home, Rainbow Six 3: Raven Shield, Tomb Raider: Angel of Darkness, ArcSoft Video Impressions, CyberLink PowerDVD, PowerProducer Gold, Ahead Nero Express	Windows XP Home, Acer eConsole, Aspire FM & TV, NTI CD+DVD Maker Gold, CyberLink PowerDVD 5.0, Works 8.0, Links 2003, Age of Mythology, Flight Sim 2004, Webster's Encyclopedia	Windows XP Home, InterVideo WinDVD 5, Ahead Nero	Windows XP Home, InterVideo WinDVD, Ahead Nero OEM, Counter-Strike: Condition Zero	Windows XP Home, Norton Internet Security 2004
Other features	Dell 2.0 speakers	Ozaki EM928 5.1 speakers	Coolermaster green cathode, perspex window, Altec Lansing AV5500B speakers	Auditek 1,200W 5.1 speaker system	Acer 2.0 speakers, card reader	None	Altec Lansing 220 2.0 speakers	Creative FPS1600 speakers, card reader, perspex window
3DMark01 SE Pro	5,379	6,162	11,676	18,462	6,567	19,405	18,705	10,829
3DMark03	1,363	1,702	3,044	9,193	1,810	11,351	6,033	3,401
Business Winstone	18.9	20	20.5	21.3	21.6	20.8	21.5	21.1
Multimedia Content Creation Winstone	26.7	25.3	26.5	29.6	27.7	26.3	27.1	27.4
Halo (fps)	20.77	27.74	38.45	69.3	28.71	79.7	65.62	37.18
PCMark04	4,056	3,234	3,420	5,107	4,400	3,894	5,020	3,761

External hard drives

USB memory keys? Please! *Tim Dean* ups the gigabyte limit with these nine external drives.

For all the fuss about high-capacity optical disks and flash storage, the truth is they can't cut it when it comes to heavy lifting. We're talking about lugging your DivX video collection to a friend's house, or 10 years' worth of business data to a remote office.

The new generation of portable drives store 40GB or more, weigh as little as 200g, and can easily carry a media library across town in your pocket or suitcase.

This Labs Challenge looks at a wide range of drives, from 200g portables with USB 2.0, to 1.2kg metal monsters packing 250GB+ and FireWire 800, which were run through a rigorous testing suite to find out which ones make the grade.

When you're choosing an external hard drive, you first need to decide on an interface. These days, with 7,200rpm drives and USB 2.0 delivering up to 60MB/s throughput, and FireWire 800 pushing that up to 100MB/s, an external disk doesn't need to be slower than an internal one. Furthermore, the days of fiddling with SCSI terminators and jumpers are thankfully well behind us.

Most modern PCs have USB 2.0 ports, and many also include FireWire on the motherboard. For the best performance, go for FireWire 800, although you'll probably have to fork out for a PCI card on top of the price of the drive.

If you're just using the drive to dump files, go for one with high capacity and fast performance. If you need one for methodical backups, then choose a drive that includes decent software that's tailored to that drive and isn't adapted from a generic tape or disk suite. You could even get a standard external drive and then buy an off-the-shelf software backup package, although you can expect this to add another $100 or so to the overall price.

Drives like these used to be a luxury, but with large video files and high-resolution digital camera files becoming increasingly common, investing in extra gigs is just a matter of time.

How we tested

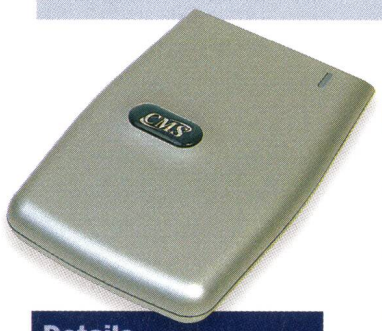
A suite of benchmarks were run to test the external drives in a wide variety of environments and applications. The first test was Futuremark's PCMark04 Hard Disk Drive Test Suite (**www.futuremark.com**). This consists of four components that simulate common real-world tasks.

The PCMark04 tests give an accurate indication of a hard drive's performance in day-to-day usage, but they don't simulate very large transfers, such as video files. To test this, we copied a 1GB file to and from the testbench and timed it each way.

Having done that, we used Iometer (**www.iometer.org**) to measure the raw speed of the drives in megabytes per second (MB/s) on multiple intensive transfers. We used the same 1GB data set on each drive and ran a wide range of tests. All interfaces available were tested, with the fastest results indicated on the feature table (see page 66).

Other considerations included design, bundled software, connectivity (USB 2.0 /FireWire/FireWire 800), features like one-touch backup buttons and USB power.

Our testbench consisted of a 2.8GHz Pentium 4 with HyperThreading on an ABIT IC7-G motherboard with 1GB of dual-channel DDR running at 466MHz. Internal storage was handled by two 160GB 7,200rpm Seagate Barracudas running in RAID 0 configuration to ensure maximum I/O throughput. The RAID array was defragged for each test. USB 2.0 and FireWire were handled by the ABIT IC7-G's onboard controllers, and FireWire 800 was handled by a LaCie FireWire 800 PCI card.



CMS ABSplus 40GB

Details

Contact	Elantra
Phone	(02) 8835 4955
Online	www.elantra.com.au
Price	$550
✔	Excellent backup software.
✖	Slow; expensive; no FireWire.
Verdict	★☆☆☆☆

In every product roundup there's a winner, a close contender or three, and a dunce. Unfortunately for the CMS ABSplus 40GB, it falls into the latter category, as it's outclassed in just about every way by just about every other drive.

ABS stands for Automatic Backup System, and the ABSplus comes with the impressive BounceBack Professional backup suite. This software is excellent and can back up and restore single files or your entire system. However, this is where the CMS's redeeming features end.

The first black mark against the ABSplus is its plastic casing — most of the other drives in this roundup are made of durable metal and they're more aesthetically pleasing. Inside the case you'll find a standard 40GB 4,200rpm drive, and connectivity is provided by USB 2.0 — no FireWire here. Performance is definitely not the ABSplus' strong point, as it came a clear last in every test. For instance, it took four minutes and 44 seconds to copy the 1GB file to and from the drive compared with two minutes and 57 seconds for the fastest 40GB drive, the LaCie Mobile.

The unit weighs a light 200g, and conveniently uses USB power in lieu of an external AC adaptor, but these features can't compensate for the low performance and very high price. Given that most of the portable drives are around $200 cheaper, and even the 250GB Maxtor OneTouch II and LaCie d2 drives are less expensive, give this one a wide berth.

CMS ABSplus 250GB



Details

Contact	Elantra
Phone	(02) 8835 4955
Online	www.elantra.com.au
Price	$748
✔	Excellent backup software.
✖	Lacklustre performance; very expensive.
Verdict	★★☆☆☆

The CMS ABSplus 250GB is geared towards data backup rather than just file storage and, like its 40GB counterpart, comes with a copy of the BounceBack Professional software package.

With the BounceBack suite you can set up total or incremental backups, schedule backups, view and restore individual files and more. You can even configure the ABSplus 250GB to be bootable if you're using a Mac, just in case your entire drive fails. As a total backup product, BounceBack has a broad range of features and is easy to use. In this way it's comparable to the Maxtor OneTouch II, although unfortunately this is where the similarity ends.

Besides the backup functionality provided by BounceBack, the CMS ABSplus is fairly uninspiring. Its 7,200rpm is strong, although its performance wasn't at the top of the pack. Of particular note was the 1GB file transfer, which took four minutes and four seconds, ranking this drive third from the bottom. In the Iometer test it scored around the middle, behind the Iomega 40GB, LaCie d2 and the Maxtor OneTouch II. It was the same in PCMark04, where it scored 3,050 compared with 4,948 for the top-ranking LaCie d2.

The housing is also reasonable, but not as solid or slick as the Maxtor OneTouch II or LaCie d2. The ABSplus 250GB also only supports USB 2.0, so it's compatible with a wide range of systems, but doesn't benefit from the flexibility or added performance of FireWire.

Finally, this is the most expensive drive in this Labs Challenge at nearly $750.

Daisycutter 2.5 External 40GB



Details

Contact	Silicon Memory Technologies
Phone	(02) 9417 7822
Online	www.siliconmemory.com.au
Price	$315
✔	High speed; carry case; light.
✖	No software.
Verdict	★★★½☆

Most ultra-portable external drives use standard notebook hard disks that run at 4,200rpm, although the Daisycutter sets itself apart from the 2.5in crowd by being the only one with a 5,400rpm drive.

These higher speed drives deliver better performance both in terms of sustained transfer rates as well as latency, as the read/write head is passing over more of the disk surface every second. For this reason the Daisycutter performed well above the average for the other portable drives in the PCMark04 test suite, with a reading of 2,682, although this was less than the scores of all the 7,200rpm desktop drives.

Although the Daisycutter is one of the few drives in this roundup with FireWire 800, it performed significantly better when using USB 2.0. While the disk itself is fast, the interface held the drive back slightly in some tests. Still, the Daisycutter is a great choice for someone who wants a portable drive with the best possible performance but doesn't want a large desktop unit.

The enclosure measures 7.5 x 1.4 x 12.5cm, which makes it one of the smaller drives tested, and comes in a simple but slick case, with a single-activity LED on the front facia to keep you company during file transfers. At 200g, it's also one of the lightest drives in this roundup. The Daisycutter 2.5 External comes with a tidy carry case, which even includes a small screwdriver for maintenance. However, there is no software included.

IBM Portable 40GB



Details

Contact	IBM
Phone	13 24 26
Online	www.ibm.com.au
Price	$399
✔	Backup and restore software.
✖	No FireWire.
Verdict	★★★☆☆

Unlike other drives in this roundup, the IBM Portable 40GB is specifically tailored towards IBM ThinkPad notebook and ThinkCentre desktop PC users, although the drive is still usable on any PC.

The main feature of the Portable 40GB is its backup and restoration capability. Included with the drive are IBM's Rescue and Recovery with Rapid Restore software, which, as the name indicates, can take a full backup of your system and restore the whole lot in the event of a disk failure or data loss. The drive is also bootable, assuming your BIOS supports booting from USB. If so, you can initiate the restore process directly from the Portable 40GB, which is handy if your PC or notebook disk has bought the farm and can't be booted at all.

The design resembles IBM's ThinkPad notebooks, with the same matte black finish. The drive also comes with a carry case which fits the whole lot, including drive, USB cable and USB power cable, so there's no need for a separate AC adaptor.

The only feature missing is FireWire connectivity, although the Portable 40GB isn't built for speed, it's built for simplicity and backup. As a result, performance is average, taking four minutes and 16 seconds for the 1GB file transfer — the second slowest in this roundup. This makes the IBM Portable 40GB a poor choice for frequent file copies.

At $399 it's also a little expensive, but if you're looking for a drive with comprehensive backup and restore features, the IBM is still worth a look.



IceCube Generation II 250GB FireWire 800

Details

Contact	Silicon Memory Technologies
Phone	(02) 9417 7822
Online	www.siliconmemory.com.au
Price	$515
✔	Slick design.
✖	Disappointing performance; no software.
Verdict	★★★½☆

Only a few years ago everything was translucent plastic, following on the heels of the Apple G4 and iMac. Perhaps this desire to emulate Apple design explains why so many peripherals, such as the IceCube, are now coming out with brushed metal finishes that make them look like miniature versions of a new Power Mac G5. Whatever the inspiration, the IceCube's design is definitely slick, especially when the blue activity LED starts to emanate through the front grille.

At the back of the case the IceCube offers the full range of interface options, including USB 2.0, FireWire and FireWire 800. Inside the enclosure sits a 250GB 7,200rpm drive. The spec is decent, so you'd expect high performance, but the results were somewhat disappointing. The IceCube fell behind the Maxtor OneTouch II and the LaCie d2 in all three benchmark tests, although it still managed a respectable score overall of 4,268 in PCMark04, the fourth highest ranking.

Results weren't as good in Iometer — the drive came fourth last, though things improved slightly in the 1GB file transfer, which took three minutes and seven seconds. Like the Daisycutter, the IceCube performed better in USB 2.0 than it did in FireWire 800, which may imply an issue with the firmware or FireWire implementation.

Otherwise, the IceCube is a fairly barebones offering, with only USB and FireWire 800 cables provided, along with the AC adaptor. Even though there's no software included, at $515 it represents good value for money in cost per megabyte.



Iomega HDD 40GB USB 2.0 & FireWire

Details

Contact	Iomega
Phone	(02) 8223 9140
Online	www.iomega.com.au
Price	$499
✔	Light and compact; Norton Ghost 2003 software.
✖	Only 4,200rpm.
Verdict	★★★½☆

This 40GB device fits into the portable end of the HDD range of external hard drives. It comes in a tidy package that features Iomega's signature design styling — a departure from the current trend towards brushed metal finishes. At 230g, the whole drive is light, although it's a bit bigger than other portable drives in this roundup.

Inside the case is a 40GB 4,200rpm hard disk, which is standard fare for this class of drive. In the benchmark tests the HDD performed at around the same level as the other portable drives, although it managed a particularly strong score in Iometer when using FireWire, achieving a 7.89MB/s transfer rate — faster than two of the desktop drives in the roundup. The score with USB was considerably lower in Iometer, as well as in other tests, so FireWire is clearly the preferred interface for the HDD.

The Iomega bundle comes with a pre-installed setup application along with a CD full of utilities. Also included is a copy of Norton Ghost 2003 for those who want to image or back up their system.

It was a close call between the Iomega and Daisycutter as the pick of the 40GB units, but this drive proved to be a more rounded package.

Note: While this drive was still listed on the Web sites of Iomega and Harris Technology at press time, Iomega informed *APC* that the drive was being discontinued. Iomega have other capacity units available, including the 60GB USB 2.0/FireWire Portable HDD, priced at $359.

The big disc



If even 250GB isn't enough, where do you turn? Mere mortals start purging old DivX rips, but you don't have to if you've got LaCie's Big Disk (from $515, *www.lacie.com.au*). Featuring two hard disks running in RAID 0 striped configuration, this monster is available in capacities of up to 500GB. With RAID 0, the data is split and spread across the two drives, which improves performance, albeit at the expense of reliability.

If that's still not enough capacity, you can turn to the even more aptly named Bigger Disk Extreme (from $3,275). This puppy packs in no fewer than four 400GB drives, all bound together with RAID 0, to offer a disturbingly massive 1.6 terabytes. Just to put that in perspective, that means it has the capacity to store around 370 DVDs, or 2,300 CDs, or that old chestnut, about half a million copies of the complete works of Shakespeare. Install triple surge protection, that's all we're going to say.

Size matters: *the LaCie d2 (see page 64), Big Disk and Bigger Disk Extreme.*

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LaCie d2 250GB

Details	
Contact	LaCie
Phone	(02) 9669 6900
Online	www.lacie.com.au
Price	$499
✔	High capacity; fast (FireWire 800).
✖	Heavy.
Verdict	★★★★☆

When it comes to interface options, you're spoilt for choice with the LaCie d2. It packs in USB 2.0 as well as FireWire and FireWire 800, so you shouldn't have any problems getting it to work with any modern PC. This is a great feature if you want to use FireWire 800 for maximum performance, while acknowledging that you will need to hook the drive up to other machines from time to time and use a more popular interface. The drive also comes with the full range of cables, including Sony i.Link.

The device's spec is also impressive. The 250GB 7,200rpm hard disk is surrounded by a brushed metal exterior, delivering high levels of performance with the help of the FireWire 800 interface. The d2 topped the PCMark04 tests with a score of 4,948, beating even the Maxtor OneTouch II. It was also the quickest in the 1GB file transfer at two minutes and four seconds, although it was markedly slower than the OneTouch II in Iometer.

The software bundle includes LaCie's Silverlining Pro, which includes a number of disk utilities, such as partitioning and formatting. Also included is SilverKeeper, a Mac-only backup application.

At 1.5kg, the d2 isn't ultra-portable — in fact, it's the heaviest drive in this roundup — but the metal housing is sturdy, slick and cool. It's also stackable or rack-mountable.

For speedy, high-capacity external storage, the LaCie d2 is a great choice. But if you want backup as well, go for the Maxtor OneTouch II.



LaCie Mobile Hard Drive 40GB 4,200rpm

Details	
Contact	LaCie
Phone	(02) 9669 6900
Online	www.lacie.com.au
Price	$319
✔	Light; affordable.
✖	Average performance.
Verdict	★★★½☆

This is an impressive little drive with a spartan design by FA Porsche, a company which designs everything from houses to watches and shoes. The enclosure is solid and durable, with a small activity LED at the front and only three connector ports at the back. But perhaps the best feature of the LaCie Mobile is the price — at $319 it's the cheapest drive in this roundup.

The drive also sports USB 2.0 and FireWire, although performance wasn't stellar, with the drive near the bottom of the roundup in PCMark04 with a score of 2,145. The Iometer score was also the second lowest in the pack, less than half the result achieved by our testbench.

Interestingly, though, the LaCie Mobile performed very well in the 1GB transfer, taking just two minutes and 57 seconds. This was only beaten by the Maxtor OneTouch II and the Lacie d2, both of which used Firewire 800 for the transfer. The LaCie Mobile worked fast when writing to the drive, although writing back to the testbench was considerably slower.

Also worth noting is the inclusion of an additional dedicated USB power cable for when the drive needs to draw more juice. The drive functions perfectly well without it, but you'll get better performance with the USB power cable attached.

If you're after pure speed in a portable hard disk drive, then the Daisycutter is the way to go. Still, you can't go really wrong with this unit. It measures just 7.6 x 1.7 x 12.9cm and only weighs 200g, making it an excellent-value portable choice.



Maxtor OneTouch II 250GB

Details	
Contact	Maxtor
Phone	(02) 9369 3662
Online	www.maxtor.com.au
Price	$399
✔	Fast; excellent backup.
✖	Large and heavy.
Verdict	★★★★½

The Maxtor OneTouch II continues a trend set by its predecessors by offering a full backup suite. The drive is bundled with Dantz Retrospect along with Maxtor's own custom interface. The selling point is the luminous blue button on the front facia, which is linked into the software so that a single press will kick off the backup.

In terms of backup, the OneTouch II falls somewhere between burning things to DVD and a tape or proper offsite system. This means it's a decent choice for individual workstations in case of disk failure, but not recommended as the sole backup for an office or server.

Ultimately, we suspect more users will choose the Maxtor for its speed and capacity, and use it for regular storage tasks, rather than depend on it as a dedicated backup device.

Speaking of speed, this is an area where the OneTouch II clearly excels. It's very fast, absolutely hammering the opposition in the Iometer test, with a transfer rate of 15.1MB/s. In PCMark04 and the 1GB transfer test it fell slightly behind the LaCie d2, which supports the faster FireWire 800 interface, while the OneTouch II has USB 2.0 and FireWire.

The only downside is the device's sheer size and weight. At 1.38kg, not including the power supply, lugging it around is a daunting proposition (though the IceCube and LaCie d2 are heavier).

Costing $399, the Maxtor represents great value per megabyte and is a worthy Editor's Choice.

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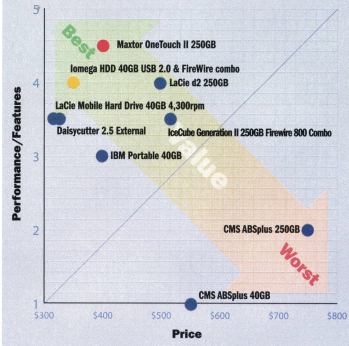
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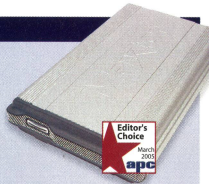


It was definitely a close fight this month, with a number of drives offering top performance and great software at very good prices. At the end of the day, we were looking for the drive that had the best mix of these features, and perhaps threw in a little extra. The Maxtor OneTouch II came the closest.

Not only does the Maxtor deliver a strong performance, it also comes with an excellent software backup suite. This makes it an ideal choice for anyone looking for plenty of storage space and backup software to provide peace of mind. The OneTouch feature itself is also a nice addition, taking some of the pain out of getting the backup going.

There were a number of other impressive drives in this roundup. LaCie has produced a terrific offering with its large d2 250GB unit — an excellent drive for those who just want size and speed.

The IceCube was also a contender in the desktop drive department, with slick looks, high speed and a range of interface options. Iomega's HDD 40GB portable was also strong, although the model was being superseded as we went to press.

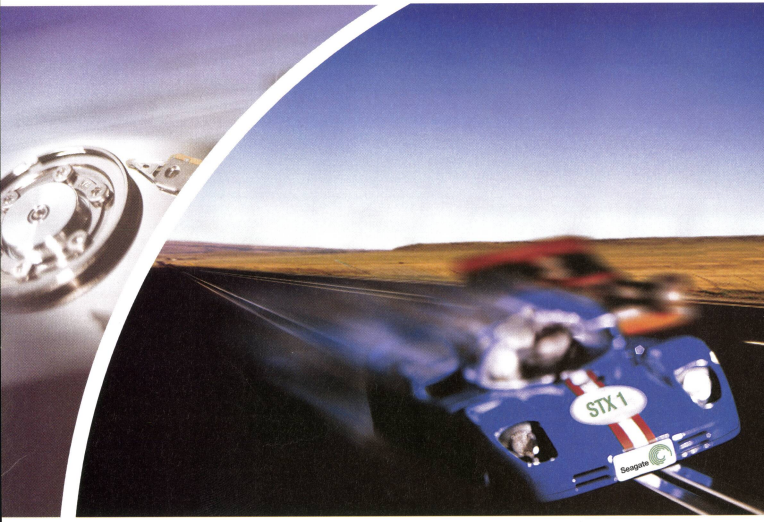


External hard drive specifications

				★ Editor's Choice					
Product	LaCie Mobile Hard Drive 40GB 4,200rpm	Daisycutter 2.5 External 40GB	IBM Portable 40GB	Maxtor OneTouch II 250GB	Iomega HDD 40GB USB 2.0 & FireWire	LaCie d2 250GB	IceCube Generation II 250GB FireWire 800	CMS ABSplus 40GB	CMS ABSplus 250GB
Price	$319	$315	$399	$399	$499	$499	$515	$550	$748
Weight	200g	200g	241g	1.38kg	230g	1.5kg	1.385kg	200g	1..089kg
Dimensions (WHD, cm)	7.6 x 1.7 x 12.9	7.5 x 1.4 x 12.5	7.5 x 1.5 x 14	14 x 4 x 22	9 x 1.8 x 15	17.5 x 4.4 x 15.9	13.6 x 4.1 x 21.4	8.5 x 2.3 x 12.8	11.6 x 3.5 x 18.2
Connectivity	FireWire; USB 2.0	FireWire 800; USB 2.0	USB 2.0	FireWire; USB 2.0	FireWire; USB 2.0	FireWire 800; FireWire; USB 2.0	FireWire 800; FireWire; USB 2.0	USB 2.0	USB 2.0
Capacity	40GB	40GB	40GB	250GB	40GB	250GB	250GB	40GB	250GB
Disk speed	4,200rpm	5,400rpm	4,200rpm	7,200rpm	4,200rpm	7,200rpm	7,200rpm	4,200rpm	7,200rpm
Cache	8MB	16MB	2MB	16MB	8MB	8MB	8MB	8MB	8MB
Power supply	USB power cable	AC adaptor	USB power cable	AC adaptor	AC adaptor	AC adaptor	AC adaptor	USB power cable	AC adaptor
Software	Silverlining Pro; SilverKeeper	None	Rescue and Recovery	Dantz Retrospect	Norton Ghost 2003	Silverlining Pro; SilverKeeper	None	BounceBack Professional	BounceBack Professional
Accessories	FireWire cable; USB cable; USB power cable.	FireWire cable; USB cable; AC adaptor; carry case; screwdriver.	USB cable; USB power cable; carry case.	USB cable; FireWire cable; AC adaptor; vertical stand.	USB cable; FireWire cable; AC adaptor.	USB cable; FireWire cable; iLink cable; FireWire 800 cable; vertical stand.	FireWire 800 cable; USB cable; AC adaptor.	USB cable; USB power cable.	USB cable; AC adaptor.
PCMark04 HDD test	2,145	2,682	2,156	4,497	2,204	4,948	4,268	2,017	3,050
Iometer (MB/s)	4.62	5.45	6.06	15.10	7.89	8.06	5.71	4.25	7.20
1GB copy (read/write)	2 mins, 57 secs	3 mins, 33 secs	4 mins, 16 secs	2 mins, 11 secs	3 mins, 13 secs	2 mins, 4 secs	3 mins, 7 secs	4 mins, 44 secs	4 mins, 4 secs

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Image editing software

How we tested

Programs were rated on their ability to deal with high-res image processing, support for RAW image files, 16-bit per channel colour, advanced editing and file management tools. They were installed on a PC running Windows XP SP2 and a 3.2GHz Hyper-Threaded Pentium 4 with 1GB RAM.

Images were imported from two cameras, a Canon 300D digital SLR with 1GB flash card and a Nikon 5400 with 1GB flash card, as well as reading a 1GB flash card from a Belkin USB 2.0 flash card reader.

Twelve 8MB RAW files in one folder were opened, their resolutions changed to 300dpi and then saved as TIFF files in a separate folder. This could only be completed by applications that can import RAW images from digital cameras.

In the next test, resolutions of 20 JPEGs were changed to 300dpi, resized to 8 x 10in, an automatic image enhancement was applied, then they were saved as TIFF files.

Which apps are best for serious digital camera enthusiasts?

***Denis Gallagher* puts seven contenders to the test.**

Hard-core image work needs serious software, so we searched for apps that go beyond the usual dodge and blur editing features. Photoshop CS sets the benchmark here thanks to features such as four-colour separations (CMYK). What's more, it can work with 16-bit per channel colour images instead of the standard 8-bit per channel. If you're in the high-resolution camp you can never have enough firepower. After all, the current 4- and 5-megapixel cameras can produce a full-page photo-quality A4 or A3 poster print.

While Photoshop CS is superior, this roundup was about seeing how other apps stack up next to it. Adobe Photoshop CS and Elements 3.0, along with Paint Shop Pro 9.0, provide great support for 16-bit per channel images.

Another popular professional-level feature that power users might use is support for RAW image files, which provide uncompressed image data that's as close as a digital file can get to traditional film. Support for RAW data varies between applications in this roundup — some can't handle the format.

File management is also increasingly important to digital camera buffs. While there are plenty of management apps, dedicated editing programs are also improving in this area. All the applications here except for Gimp 2.0 have a browser-based file management utility which can tag files.

Beyond JPEG — what to do if you're obssessed with photo resolution

RAW is an uncompressed format that provides the most accurate data collection possible. The image brings none of the biases of the camera, in terms of colour saturation and hue, so what you get is the camera exposure result and nothing else. Working with RAW also allows the photographer to keep the integrity of the image when importing 16-bit per channel images.

RAW files are viewed in the same way as any other file, with full EXIF support showing metadata such as f-stops, the model of the camera, ISO, whether a flash was used and even the focal range of the lens. Adobe Photoshop CS and Elements 3.0 provide the most RAW import support for the latest cameras, but there are also a growing number of RAW image specialist utilities. They're not cheap — prices range from $100 to $500 or more — but trials for both programs below are available as free downloads.

■ Breeze Browser (*www.breezesys.com*) Download and convert images from Canon, Nikon, Pentax, Minolta and Olympus digital cameras; display Adobe Digital Negative (DNG) files; rotate and crop JPEGs without loss of quality; make contact sheets.

■ Phase One Capture One (*www.pictureflow.com*) RAW file support for Olympus, Canon, Fuji, Nikon, Pentax; noise reduction, exposure compensation and colour correction features; available for Mac and Windows.



Details	
Contact	Lako Pacific
Phone	1800 657 601
Online	www.lakopacific.com
Price	$149
✔	Powerful file management; extensive RAW file controls.
✖	Basic editing options.
Verdict	★★★☆☆

ACD Systems ACDSee PowerPack 7.0

While it's not a standalone editing application, ACDSee PowerPack does have RAW file compatibility and the best controls and output options available in the roundup, rivalled only by a dedicated RAW file conversion application. With a few simple menu selections you can automatically convert and rename a folder of RAW image files to one of over a dozen file formats, with control over the compression, resolution and destination folder.

The RAW performance test was the fastest here, coming in at one minute and 45 seconds, beating even Photoshop CS. The batch JPEG job was the slowest in the roundup, though.

Editing options are very basic compared with Photoshop CS, Paint Shop Pro or even Photoshop Elements 3.0. It will handle most jobs you throw at it, though if you need real editing firepower then the feature list is too basic. A wizard provides the autocorrect options for digital photos.

ACDSee excels in categorising photos and slideshows quickly. While apps such as PhotoImpact 10 and Photoshop Elements 3.0 offer strong file management and viewing capabilities to supplement their photo editing and enhancement features, ACDSee PowerPack 7.0 takes an alternative approach. The program allows you to export your images as a slideshow with transitions and attached sound to a CD, or even online. You can also optimise images to send them to mobile phones. Handy, but it's not high-resolution work.

Adobe Photoshop CS

Many professional photographers and graphic designers consider Photoshop the only choice, and CS adds stronger digital camera file support and an improved browser to its list of features.

Support for the RAW format in Photoshop CS is the most comprehensive of any in the roundup. RAW images take any processing decisions out of the camera's control, giving you the closest thing you can get to a digital negative. Support for 16-bit colour has also been added to allow images to be edited at the highest quality possible.

Performance in the RAW file test was impressive, with Photoshop churning through the dozen 8MB image files, resolution adjustments and saves in one minute and 50 seconds, the second fastest in this roundup. Photoshop CS beat Elements 3.0 in the second speed test, though only by seconds, clocking in at three minutes and two seconds. While the tests ran smoothly, the program didn't recognise Nikon Coolpix 5400 RAW files, and required a 2.3 RAW plug-in update.

A new file browser caches the images, so the thumbnails are quickly generated once you've visited a directory. The image listing can be sorted using many criteria including size, name, date created, date modified and a user-defined rank. This last category lets you assign a customised ranking to your images.

While the feature set is typically exhaustive, Photoshop's high price and steep learning curve work against it when compared to Elements 3.0, which performs better and is more user-friendly.



Details

Contact	Adobe
Phone	1300 550 205
Online	www.adobe.com.au
Price	$1,399
✔	Rock-solid performance; great RAW camera support; 16-bit per channel colour.
✖	Price; steep learning curve.
Verdict	★★★★☆

Adobe Photoshop Elements 3.0

Adobe has given the latest version of Photoshop Elements a substantial facelift. Improved tools and new features have also transformed Elements 3.0 into a substantial image editing package that ranks with Photoshop CS in the important areas, but without the steep price.

The RAW file functionality in Elements is just as effective as it is in Photoshop CS, though some of the more advanced controls have been left out. Like Photoshop CS, Elements 3.0 also required the 2.3 RAW plug-in to import Nikon Coolpix 5400 files for the RAW test. The first speed test clocked in at one minute and 58 seconds, just behind Photoshop CS and ACDSee, and three minutes and five seconds for the batch process of 20 JPEG files.

The editing interface provides a better overall balance between editing and managing files than the others. While some applications here favour wizards or step-by-step editing, Elements 3.0 lets you have it both ways: you can either follow a step-by-step process or work at your own speed.

Red-eye removal, always one of the more popular features in a digital image editing program, has been improved in Elements 3.0, with less need for accuracy on the part of the user. The spot healing brush is also useful.

While many of the file searching, tagging and sharing features of Elements 3.0 are described as "new", Adobe has really just added many of the functions from Adobe Photoshop Album.



Details

Contact	Adobe
Phone	1300 550 205
Online	www.adobe.com.au
Price	$179
✔	Best RAW support for a consumer package; powerful file management.
✖	Still requires some RAW plug-in downloads.
Verdict	★★★★½

Gimp 2.0 for Windows XP

Gimp 2.0 is a free, fully operational program, not shareware or feature-limited in any way. It started as a Unix program, but has since been improved by dozens of developers and ported to other platforms such as Windows. Version 2 isn't recommended for Windows 98 or lower and is very power-hungry.

There are a multitude of files to improve functionality, although many of them are Linux-only and there's no built-in RAW compatibility. However, there are downloads for this. The best option is a RAW Photo Gimp plug-in at **http://ptj.rozeta.com.pl/Soft/RawPhoto**. Several RAW plug-ins provide good support for the Canon 300D test files. The best of the RAW plug-ins can be found at **www.aei.mpg.de/~udif/UFRaw**.

Gimp isn't as easy to install as the other apps here, though if you don't mind having to install the Runtime Environment and Gimp 2.0 separately this won't bother you. Despite its strong history and loyal following, the new version isn't stable. It crashed repeatedly and couldn't complete the batch JPEG-processing job as it was unable to process more than one image at a time.

Still, the feature set is impressive, including channels, layers and masks, filters and effects, tabbed palettes, editable text tools and colour operations such as levels, though it is limited to 8-bits per channel. It's free, but only worthwhile if you're willing to do some hunting for file plug-ins and put up with crashes.



Details

Contact	The Gimp
Online	www.gimp.org
Price	Free
✔	Free; amazing effects; available for Linux.
✖	Clunky interface; buggy performance; poor RAW support.
Verdict	★★½☆☆



Jasc Paint Shop Pro 9.0

Details	
Contact	Communique
Phone	(02) 9622 5624
Online	www.comm-unique.com.au
Price	$269
✔	16-bit per channel colour.
✖	Average RAW compatibility; relatively slow.
Verdict	★★★½☆

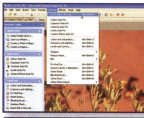
Paint Shop Pro offers powerful, professional-level features at a reasonable price, and version 9.0 introduces 16-bit colour support and a level of RAW control that should satisfy digital camera users.

Although Paint Shop Pro 9.0 (PSP9) supports RAW file importing, the camera models included aren't as extensive as Adobe Photoshop CS or Elements 3.0, so it's worth checking **www.jasc.com** before buying. It doesn't support any of the Nikon Coolpix models, though it does read a good range of Nikon digital SLRs as well as a few from Olympus and Fuji. The Web site says Paint Shop Pro's auto-update feature provides support for additional camera models as they become available.

Performance with the Canon 300D files in our RAW speed test didn't break any records at a respectable two minutes and 10 seconds. PSP9 managed to beat ACDSee PowerPack and Microsoft's Digital Image Suite in the second speed test, which took three minutes and 10 seconds.

Although you don't get as much control over the image as in Photoshop CS or Elements 3.0, PSP9 excels at editing. There are photography filters for removing noise, chromatic aberrations and correcting exposure, as well as selective undo. Image metadata is also well managed, with EXIF information supplied in the image browser.

New art media tools provide some creative options for users who want to work with natural media — you can smear and dabble your image using virtual oil or acrylic brushes without having to get a full-blown paint program.



Microsoft Digital Image Suite 10

Details	
Contact	Microsoft
Phone	13 20 58
Online	www.microsoft.com.au
Price	$169.95
✔	Easy to use; good file management; respectable batch conversion.
✖	Restrictive wizard-based interface; no RAW compatibility.
Verdict	★★★☆☆

While Microsoft's Digital Image Pro fits more directly alongside the other standalone editors here, at the moment it's only sold in Australia as part of the Digital Image Suite 10 (DIS10) package. (Although, to sweeten the deal, Microsoft is offering $50 cashback until April 24.)

The batch facility is first-rate, though not the fastest, with DIS10 completing the test in three minutes and 20 seconds. However, file support isn't as extensive as other apps here, and the lack of RAW file support is a major drawback in a shootout catering to hard-core digital camera users who want more than the RAW utilities that come with their camera. The program encourages you to work with the PING format for most operations.

Digital Image Suite 10 is certainly slick, with animated illustrations that can be turned off when you become more experienced. Special effects include charcoal and pencil sketch and 3D, plus picture frame edges and backgrounds. For power users, though, the interface is too restrictive, encouraging you to follow rigid wizards.

Because it's a suite, DIS10 excels at organising photos, with an array of tools to help you sort, enhance, share and archive. Thumbnails of recently opened images are handy, while a simple slide bar lets you adjust the image size of your current project. A flag-based file management tool works surprisingly well, although Photoshop Elements 3.0 has a more efficient version with better previews.



Ulead PhotoImpact 10

Details	
Contact	Lako Pacific
Phone	1800 657 601
Online	www.lakopacific.com
Price	$189
✔	Good effects; GIF animator; Web features.
✖	No RAW support.
Verdict	★★★☆☆

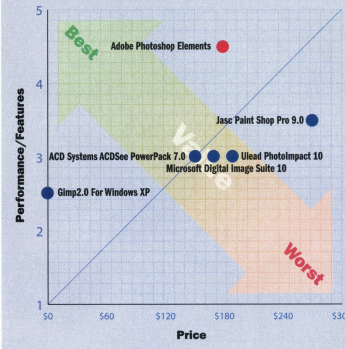
The lack of support for RAW file import is a big drawback with here, particularly when consumer cameras such as the Canon Powershot S60 offer a RAW option. The batch JPEG jobs clocked in at three minutes and eight seconds, putting PhotoImpact in third place. The most noteworthy improvement is to the interface, finally bringing the palette and menu controls into line with other graphics programs such as Adobe Photoshop Elements 3.0.

Working with image collections is now much easier because the Browse Manager has been separated from the Layer Manager. This allows you to follow the standard Windows convention for selecting files, such as dragging and dropping on to the workspace, and selecting multiple files.

An improved red-eye tool allows you to select multiple eyes, saving time and keeping the effect more consistent, while the editable smart lasso selection is useful when you need to precisely select an image area. An improved preview pane with split windows showing a before and after shot is better than the previous setup, where you had to go through with the effect and then revert if you weren't satisfied. There's also a range of "artistic effects" for montages that approximate oil paint, engraving, pen and ink, stippling and so on.

Along with general HTML text support, you also get several Web page templates to help build a page with a few clicks. The program supports Web-safe colours, so your images have uniform colour across any browser. Current PhotoImpact users will be disappointed that GIF Animator 5.0, bundled with PhotoImpact 10, still hasn't changed from previous versions.

apc price-to-performance ratio





Adobe Photoshop Elements 3.0 has a feature set that should satisfy the most demanding digital camera enthusiast and an interface that balances quick editing with useful advanced features. Filters and effects are a mouse-click away, and the RAW file support and ability to both open and manipulate 16-bit per channel colour images give it an edge over Digital Image Pro 10 and PhotoImpact 10.

Incorporating most of the features of Photoshop Album has also turned Elements into a formidable image management tool, with features that some of the other applications here would require you to buy separately.

Adobe Photoshop CS is undeniably the pre-eminent professional graphics package and will continue to dominate the top end of the market. However, we haven't included it in the scatter graph because it's so much more expensive than the other programs that it distorts the results.

Paint Shop Pro 9 has all the power of Photoshop CS but loses points for its less than stellar RAW file support and batch file conversion speeds.

Image editing software specifications

	Gimp 2.0 for Windows XP	ACDSystems ACDSee PowerPack 7.0	★ Editor's Choice Adobe Photoshop Elements 3.0	Microsoft Digital Image Pro 10	Jasc Paint Shop Pro 9	Ulead PhotoImpact 10	Adobe Photoshop CS
Price	Free	$149	$179	$169.95	$269	$189	$1,399
RAW support	Option	Good	Excellent	✖	Average	✖	Excellent
CMYK support	✖	✖	✖	✖	✔	✖	✔
JPEG 2000 support	✔	✔	✔	✔	✔	✔	✔
Scripting	✔	✔	✖	✖	✔	✖	✔
Automatic colour correction	✖	✔	✔	✔	✔	✔	✔
Chromatic aberration removal	✖	✖	✔	✔	✔	✖	✔
Photo layout printing templates	✖	✔	✔	✔	✔	✖	✔
Text on a path	✖	✖	✖	✖	✔	✔	✔
Visual file browser	✖	✔	✔	✔	✔	✔	✔
Integrated screen capture	✖	✔	✖	✖	✔	✔	✖
Photoshop plug-in support	✔	✔	✔	✔	✔	✔	✔
PDF creation	✖	✔	✔	✖	✖	✖	✔
Record images to CD/DVD	✖	✔	✔	✔	✖	✔	✖
Photo search	✖	✔	✔	✔	✖	✔	✔
Web optimisation	✔	✔	✔	✔	✔	✔	✔
Digital camera noise reduction	✖	✖	✔	✔	✔	✔	✖
Colour depth support	16-bit	8-bit	16-bit	8-bit	16-bit	8-bit	16-bit
Speed test 1 (RAW performance)*	N/A	1 min, 45 secs	1min, 58 secs	N/A	2 mins, 10 secs	N/A	1 min, 50 secs
Speed test 2 (resizing and auto enhance)**	N/A	3 mins, 25 secs	3 mins, 5 secs	3 mins, 20 secs	3 mins, 10 secs	3 mins, 8 secs	3 mins, 2 secs

*Open a collection of 128MB RAW files contained in a folder, change the resolution to 300dpi and save as a TIFF file in a separate folder. This process could only be completed by applications which can import RAW images from digital cameras; PhotoImpact 10, Digital Image Suite 10 and Gimp 2.0 couldn't perform the task. **Open a high-resolution JPEG image of around 3.5MB and change the resolution to 300dpi and the size to 8 x 10in. Then an automatic image enhancement was applied to the image and saved as a new TIFF image file in another folder. This series of actions was performed on 20 separate files using a batch or automatic process. The time taken to complete the task is shown in the chart.

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Gimme more

Upgraders are spoiled for choice this year. Whatever you use your PC for, whether it's an all-round family machine, small business hub or dedicated strictly to gaming, there's a way to make it better. Get ready to rock...

From 64-bit CPUs to DDR2 memories and Serial ATA II hard disk drives, improved or faster versions of the components in today's computers will dramatically raise the performance of desktops in 2005.

Some of these technologies are already on the market, while others should be widely available in the near future. With so many improvements in the pipeline, *APC* examines the difference they can make to your PC and its applications.

To make the impact of these changes more relevant to real world use, this feature identifies their potential effect on five types of systems: the all-rounder, the video editing PC, the media centre, the gaming machine and the small business server, not to mention a chapter about upgrading on a budget.

And because we understand that these things can't all be done at once, we differentiate between the upgrades that are essential and those that are just highly desirable.

For each of these systems the impact will be significant. In database servers, for example, 64-bit means banishing the 4GB memory addressing limitation, and a big increase in the speed of processing queries.

When it comes to digital video editing systems, PCIe RAID provides a boost in video storage speed and reliability. For gamers, PCI Express's greater bandwidth and Nvidia's Scalable Link Interface (see the ASUS A8N-SLI Deluxe and N6600GT review, page 34), let you install two video cards for almost double the performance.

And for virtually every other machine, SATA II, with its 375MB/s burst speeds from cache, and DDR2 memory, give PCs the ability to crunch through tasks a lot quicker.

In the home, the BTX form factor and Centrino desktops promise to turn PCs from pieces of drab, industrial-looking equipment into slick, attractive, low-power boxes that won't look out of place next to the stereo.

What's inside

Digital video, page 74
Speed up the production of movies at home.

All-rounder, page 76
Big changes to the desktop as we know it will breathe new life into the multipurpose PC.

Media centre, page 78
In the lounge or the study, 2005 will be huge for media centre PCs.

Gaming, page 80
Game worlds are about to get much more textured and detailed.

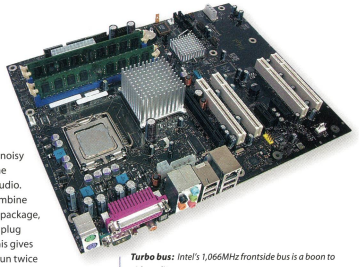
On a budget, page 82
Tips for canny bargain hunters.

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Clear that bottleneck!

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All your upgrade needs in one handy table.

Digital video PC

Movie production at home will keep getting faster and more technically advanced, writes *David Emberton*. Watch out George Lucas!



Turbo bus: *Intel's 1,066MHz frontside bus is a boon to video editors.*

AMD64/EM64T

If you're editing movies with software, a 64-bit desktop can swap massive scenes in and out of RAM with ease. It also allows for richer 3D animation and faster video compression.

But even if you're just watching them, 64-bit technology gives a more film-like experience with higher frame rates and smooth decoding of high-definition content. AMD pitches its AMD64 line — particularly the workstation-class Opteron chips — as the ultimate buy for content creators. Intel, better late than never, counters with retrofitted Pentiums and Xeons with Enhanced Memory 64 Technology (EM64T).

All these products are x86 at the core, with memory enhancements that allow them to run next-generation software and handle over 4GB of RAM. But you'll need more than just a new processor and extra memory to really go 64-bit. The operating system, drivers and software need to be updated to take full advantage of the platform. Both AMD64 and EM64T will be compatible with Windows XP Professional x64 Edition when it arrives later this year, and apps like Lightwave 3D and Dr DiVX will also be ready to run in 64-bit.

DUAL-CORE CPUS

Paired with multithreaded DV apps like Adobe Premiere or Ulead MediaStudio Pro, a dual-core chip provides faster renders and snappier performance. The chip should also be cooler, reducing the need for noisy fans and bringing some serenity back to the studio.

Dual-core CPUs combine two processors in one package, allowing twin chips to plug into a single socket. This gives your PC the power to run twice as many instruction threads, much like a multiprocessor system, only cheaper. By using two heads instead of one, manufacturers can increase overall capacity without resorting to higher clock frequencies and even hotter temperatures.

Most of the big-name video packages are already multithreaded, which makes them dual-core compatible out of the box. Intel is expected to release dual-core Pentium chips in the second half of 2005, with new Xeons following in 2006. AMD plans to have its dual-core Opteron family out by mid-year, with Athlon 64 FX chips by the end of 2005.

1,066MHZ FSB/1GHZ HYPERTRANSPORT

Sandra Bullock's not the only one who needs a fast bus. Constantly tweaking and re-rendering edited video footage means a lot of traffic between the CPU and memory, which is why improved bus speeds can help. The faster the two subsystems communicate, the closer you are to a final cut. Newly speed-bumped chipsets from Intel and AMD raise the clock speed of the CPU memory interface from 800MHz to 1,066MHz and 1GHz respectively. And while the numbers are similar, the technologies are quite different.

Introduced with the Pentium 4 Extreme Edition, Intel's 1,066MHz frontside bus boosts peak throughput to 8.5GB/s, compared with 6.4GB/s in the earlier generation. The faster bus uses the same quad-pumping scheme as the 800MHz versions, but with a higher clock speed for better video and 3D performance.

AMD takes a different road. Opteron and Athlon 64 chips have memory controllers built into the processor itself, which then talks to memory via HyperTransport links. The latest iteration of HyperTransport improves chip-to-chip communication by 25% over the 800MHz version, maintaining the low latencies and scalability that give HT its appeal.

PCIE RAID

Redundant Array of Independent Disks (RAID) means never having to say you're sorry that you just lost three reels to hard disk failure. It also means you don't have to suffer the laggy I/O of standalone drives. A RAID running over

Nice to have. . .

HYPER-THREADING

Ripping, editing and burning DVDs all at once? Intel's Hyper-Threading (HT) technology boosts the multitasking power of Pentium 4 chips by prioritising instructions on their way to the execution core.

Hyper-Threading requires an HT-enabled chipset, operating system and BIOS in order to work, and will produce a performance increase from optimised software.

NX

Don't lose your media archive to a virus. No-execute (NX) technology, in conjunction with various Linux distros and Windows SP2, allows a CPU to distinguish between data and executable instructions. This is to prevent buffer overflow exploits like those used in the Blaster, Sasser and Code Red infections. NX is also marketed as Enhanced Virus Protection and XD (eXecution Disable) for AMD and Intel Xeon chips, respectively.

LATEST GENERATION GPU CARDS

Workstation-level graphics cards are a strong buy, especially in the realms of visualisation and 3D effects processing. Latest generation cards from ATI and Nvidia offer PCI Express connectivity, more memory, and of course multiple monitor support for a larger work space.

Compared to AGP-8x cards, those based on PCI Express offer double the bandwidth.

HARDWARE FIREWALL

Running a software firewall on your DV workstation can be problematic in that they chew system resources and aren't always effective. However, in the age of ubiquitous connectivity, turning off firewall protection isn't really an option.

Nvidia pitches its onboard hardware firewall as a solution, filtering packets as they arrive and blocking any suspicious traffic.

PCI Express can increase video storage speed and reliability, so you can get that project in the can, with or without all drives intact.

PCI Express is slated to become a universal standard as it gradually replaces the older PCI and AGP. A PCI Express x8 link, like that used in Intel's SRCU42E RAID controller, can move 2GB of data per second, in both directions. A x16 link can transmit twice that amount.

RAID Level 1 and 0 have been desktop realities for a while now, but the bandwidth of PCI Express is making it possible to put Level 5, 10 and 50 configurations there too. What's more, controller cards like the SRCU42E don't burden the CPU with lots of additional disk management work — perfect for DV workstations where every clock cycle counts.

MATRIX STORAGE/NVIDIA RAID

Intel Matrix Storage and Nvidia RAID are cheaper solutions if you can't afford a dedicated controller card. Adding more drives to your system can help you achieve faster disk access, safer storage, or both. Nvidia RAID comes with nForce 2 onwards and uses a mix of software management and a Media Communications Processor (MCP). Drives can be connected by PATA and/or Serial ATA, and configured for RAID Level 0, 1 or 0+1.

Intel's Matrix Storage also requires an enabling chipset and software, but takes a different approach. Rather than a straight Level 0+1 RAID option, Matrix allows for two drives to be turned into twin virtual Level 0 and Level 1 arrays. This provides the DV artist with a fast storage space for clips and audio, and a secure area for the OS and critical data.

Such a feat normally requires four disks. In real terms, a two-disk RAID array will yield transfer rates of 80MB/s compared to around 50MB/s for a single drive. This shaves at least a minute off transfer time for a 10GB video file.

SATA II

It's deadline, and those rough cuts have to be on the production machine. Thankfully, your Serial ATA II hard drive has peak data transfer rates that are twice as fast as its SATA 1.0 predecessors. It can also be hot swapped and plugged in externally, so there's no problem carting huge files around.

SATA II drives also have Native Command Queuing (NCQ). In a typical hard disk, I/O instructions are executed in the order they're received, which can mean the read/write head skipping around to access various parts of the disk surface. NCQ uses an algorithm to analyse and tighten up the flow of commands so that adjacent areas get accessed first.

SATA II tech has the potential to carry peak loads of 375MB/s (the raw theoretical speed of SATA II is 3Gbit/s), compared with 150MB/s in the original Serial ATA standard. For video applications, a 7,200rpm drive is the minimum, and 10,000rpm is preferred.

DDR2

Video, audio and 3D applications are notoriously memory-hungry due to the sheer number of bits they need to handle in real time. And the dataset sizes are only getting bigger, as artists continue to push the limits of software. A gigabyte or more of memory is mandatory for this kind of heavy lifting, but what type of RAM is worth getting? It all depends on when you plan to upgrade and which CPU vendor you choose.

DDR2 is the next-generation standard that picks up where DDR left off, running at faster clock speeds and consuming less energy. On the downside, DDR2 is expensive, uses a new 240-pin socket, and suffers from increased read/write latencies due to operational changes in the spec. On the upside, DDR2 transfer rates are expected to reach 800MHz in 2005 (double the limit of DDR), offering peak throughput of up to 6.4GB/s and effectively overcoming the latency issue.

AMD is holding fire on DDR2 until the price/availability/performance ratio starts to make more sense. Several Intel chipsets can accommodate the new standard now.

DOUBLE LAYER DVD/BLU-RAY

Instead of making another costly trip to the replicators, get a real DVD burner. A Double Layer burner can produce DVD9-like discs that will hold a feature-length film plus extras and work on most consumer-level players. To test new DVD images at a low cost, Double Layer is a must-have.

Higher capacity discs can be invaluable for archiving, too. As a backup device, Double Layer burners can pack 8.5GB of data per side, as opposed to 4.7GB for single layer. Currently the only Double Layer format available is DVD+R Double Layer (DVD+R DL), created by the DVD+RW Alliance. The rival DVD Forum is expected to release a competing version in the near future.

Also worth a look is Blu-ray, one of the upcoming optical storage formats. It's pitched as a high-definition DVD replacement, and uses blue-violet light for increased data density. A single-layer Blu-ray disc holds 25GB of data, with double-layer media holding a whopping 50GB. Drives compatible with Blu-ray are likely to appear late in 2005.

What direction?

Which chipmaker will rule the home video studios of the future?

INTEL

Traditionally, Intel has been seen as the better choice for DV applications, offering superior multitasking and speedy video processing. It may or may not hold up to the new competition, but there are several good reasons to keep Intel inside.

Intel says it has the capacity to switch to dual-core designs in its chips, with new Pentiums arriving later this year. The company already delivers 64-bit enabled product through tier 1 suppliers, and EM64T will be available to the wider market as soon as new Windows software arrives. Intel is a main backer of PCI Express, and also has the early mover advantage on DDR2. Hyper-Threading and Matrix Storage technology are two of the Intel platform's more unique features.

DDR2 won't really come into its own until it shifts to 800MHz, but prices are expected to hover around $500 for a gigabyte pair. High-performance desktop boards based on the 925XE Express chipset are available now for less than $300, and dual-core Pentium pricing is likely to match current Extreme Edition pricing at $1,400 each, as will the dual-core Xeons. You'll pay a premium for 10,000rpm SATA II drives, but the boost will be worth it.

AMD

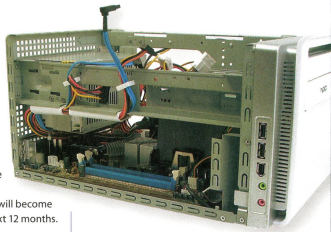
AMD has really been pushing the "cinematic computing" angle lately, touting involvement with *Star Wars: Episode III* and endorsement from a host of DV luminaries as proof that it represents the true 64-bit future. This will go some way towards mitigating the company's reputation as being mostly for games.

Dual-core Opteron chips are likely to hit the market first, and the AMD platform supports SATA II, PCI Express and, of course, the AMD64 memory extensions. One of the bigger, brighter jewels in AMD's crown is HyperTransport, the super-fast bus technology now running at 1GHz. These add up to serious video performance.

AMD is sticking doggedly to the older DDR standard for now, which means RAM prices at around $250–300 per gigabyte. AMD-compatible motherboards retail for around $200, and dual-core Athlon processors are likely to be priced around $1,500 for the premium model, with Opterons fetching slightly more. Again, expect to pay extra for fast hard drives built on SATA II.

All-rounder

Big changes to the desktop as we know it will breathe new life into the multipurpose PC, reports *Matthew Overington*.



New style: *BTX cases offer improved cooling through clever internal design.*

CENTRINO DESKTOP

Typically, an all-round machine for the home must be able to do several tasks: surf the Net, word processing, gaming, homework, storing photos and possibly even producing digital video. The advent of Centrino-based desktop motherboards will have a big impact on the entire market, but no class of PC will benefit more than the all-rounder.

The combination of the Pentium M processor, mobile chipset and integrated wireless makes a lot of sense on the desktop. The system runs cooler, it's quieter, and *APC*'s benchmark figures indicate that a 2.1GHz Pentium M processor is capable of out-performing a 3GHz Pentium 4.

Any system which shares the load of several users is likely to be turned on for most of the day, so having a low power demand is also important. The fact that the Centrino platform has moved into desktops is a godsend for those who want to reduce the power draw on their system, thanks to its meagre requirements.

NX

The system has to stay up and running under deadline pressures, so it needs to be impervious to viruses and malware. Here's where NX, an important feature found originally in AMD's Athlon 64 FX processors, comes in.

NX is enabled in Service Pack 2 and, when turned on, prevents the execution of applications in certain memory areas, which in turn helps prevent the spread of viruses. The NX flag is also available in 3.8GHz (570J) Pentium 4 processors and will become an important feature over the next 12 months.

BTX

The BTX form factor is a major rethink of the internal layout of the PC and, after the upcoming release of Centrino-based desktop systems, it's probably the most important new development in computing.

The architecture allows for simplified motherboard layout and better cooling systems, a substantial benefit to both system builders and consumers. System integrators get the advantages of constructing efficient cooling systems while simplifying the build process, and users get a quieter, cooler PC.

A few systems have already come through *APC* labs showing BTX-style implementation, with heat-generating components arranged to simplify cooling requirements, but the form factor will go mainstream in 2005.

NEXT-GENERATION VIDEO CARDS

Relatively inexpensive new video cards like ATI's Radeon X700 and Nvidia's GeForce 6600 series offer the sort of performance in all-round systems that would only have been possible in the very top contenders from a little over a year ago.

With upcoming OS releases looking to place a heavy load on the graphics subsystem, it's worth going for a dedicated card over an onboard solution. Some video editing packages can now even make use of the GPU for effects processing, freeing up vital CPU time for other tasks.

DOUBLE LAYER DVD/BLU-RAY

No upgraded system should be without a DVD writer, as it provides a flexible yet powerful backup solution while allowing families to output movies to regular DVDs.

If you're buying a new DVD burner or upgrading an old one, make sure it's a Double Layer drive which can burn discs of around 8.5GB. After some competitive price reductions last year, Double Layer drives are expected to reach $150 soon and stay there.

But even Double Layer optical drives will be superseded by an even more advanced technology, Blu-ray, which will have capacities of 50GB per disc. Industry backing for Blu-ray means it will become the mainstream DVD writing technology in a few years' time.

Nice to have. . .

DUAL-CORE/HYPER-THREADING

Though Hyper-Threading has gone a long way towards streamlining performance when a PC is running two discrete applications or processes simultaneously, the next step in the evolution is dual-core processors. These are essentially processors within processors, allowing a system to send specific calculations to one processor or the other.

AMD and Intel have both demonstrated working prototypes and will have models on sale during 2005. Ideal if you're in the habit of running many demanding apps at once but baulk at the cost of a dual-processor system.

SERIAL ATA II

The release of chipsets compatible with Serial ATA II will be big news throughout 2005. Many of the benefits of SATA didn't get rolled into the original specification, and while the biggest change between releases is support for 375MB/s transfer speeds, native command queuing (NCQ) and hot-swappable drives will be key upgrades for those looking to eke every last drop of performance from their systems.

Seagate and Western Digital already have drives out on the market supporting this feature, and the nForce 4 and Intel i925 chipsets offer NCQ.

DIGITAL TV

Though Microsoft failed to get digital TV tuners working with Windows Media Center Edition 2005 prior to launch, recent developments by third-party hardware vendors have allowed the OS to work with digital broadcasts.

This will drive a huge wave in digital TV tuner adoption across the market as everyone realises that you don't really need Microsoft's lounge room OS to timeshift broadcast television. And at less than $200 for a PCI or USB solution, you'd be mad not to go for it, especially as broadcasters add extra content to digital channels.

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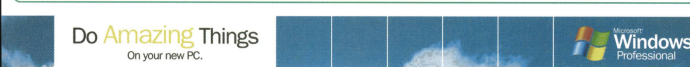
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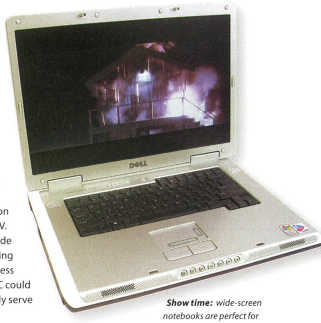


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Media centre PCs

Whether in the lounge or study, *Matthew Overington* predicts that 2005 will be a huge year for media centre PCs.



Show time: *wide-screen notebooks are perfect for watching movies on the go.*

CENTRINO DESKTOP

The Centrino platform's move from the mobile to desktop space will have a great impact on the lounge room-based media centre PC. Computers have long been ill-suited to the lounge room because the processors, video cards and power supplies that drive them have massive cooling requirements; the distracting whir of fans can negate the benefits of buying a top-notch home theatre system. Who cares how hi-fi the sound is if it's drowned out by the buzz of a heatsink fan?

The Centrino platform is ideal for small, lounge room-based PCs because it offers a blend of performance and features which will be welcome in a home environment, but it stays cool and runs quietly. The Dothan-cored Pentium M processor not only draws less current than the Prescott-cored Pentium 4s, but also runs faster at lower clock speeds. A 2.1GHz Pentium M processor runs at around the same speed as a 3GHz Pentium 4 and can be cooled using heatpipes and slow-turning fans, or even a large copper-fin heatsink.

Also, because a media centre computer often sits in a sleep state, only waking when required, the speed of recovery and depth of sleep are important things to consider. Although desktop machines have included sleep modes for a long time, because mobile users need to save so much power, portables are inherently better suited to running this way. Not only is this more environmentally friendly, it also serves to keep running costs down. After all, if you have a media centre PC, you're powering both a television and a computer rather than just a TV.

Other benefits of Centrino include built-in 802.11b/g wireless networking and hi-fi sound. With a software access point installed, a Centrino-based PC could sit in the lounge room and wirelessly serve content to the entire household.

DIGITAL TV

Although digital tuners have been on the market for a while, the fact that they're now fully supported by Windows XP Media Center Edition 2005 is bound to make them more popular. There's no reason to go for an analog-only implementation because digital broadcasts offer higher quality images and sound than analog TV.

The latest increment of Media Center includes support for two TV tuner cards running simultaneously, making it possible to record during playback.

BTX

The move to the BTX form factor will further enhance the cooling advantages offered by the Centrino platform. By lining up all the heat-generating components on the motherboard, BTX will enable more efficient cooling systems, complementing the low thermal output provided by the Pentium M processor. The result will be silent, stable, smaller PCs that integrate better into home entertainment systems.

Though a few US OEMs are shipping BTX systems, localised BTX designs are hitting the *APC* Labs right now. You can expect retail systems on the local market by April.

SATA II

The storage requirements for media PCs are overwhelming. Each hour of video footage can consume up to 3GB, which means even Hitachi's new 500GB model will fill quickly. Serial ATA II offers a number of benefits, but those running the PC as a family computer will gain the most.

Serial ATA II brings Native Command

Nice to have. . .

HARDWARE FIREWALL

As the online content of media centre PCs is bolstered through 2005, expect Internet connections to become a key consideration. Any computer that connects to the Internet has to be protected, and while software firewalls like that included in Windows XP SP2 provide good entry-level protection, the only way to be totally safe is to invest in a solid hardware firewall.

ADSL modems featuring rudimentary firewall capabilities are the norm now, but expect the range to grow and protection to become more robust as broadband uptake reaches saturation over the next few years.

NX

Although it won't be crucial for media centre PCs that don't run applications other than MCE2005, the "no execute" flag present on current-generation Intel and AMD processors is a handy feature. A media centre PC has to connect to the Internet regularly to download updates, online content and, when the licensing's worked out, electronic program guides.

NX offers an extra layer of protection for those running SP2 by stopping the execution of unwanted code and complementing a hardware firewall and antivirus suite.

802.11 PRE N

The performance of most 802.11g networks leaves a lot to be desired: though throughput is claimed at 54Mbit/s, it generally runs closer to 20-25Mbit/s, which isn't fast enough to stream high-definition video. The upcoming 802.11N standard will provide much greater performance for small wireless networks through use of MIMO technology. Pre-N gear is starting to arrive on the market now, even though the standard won't be ratified until the start of 2006. This hardware won't cease to function when the standard is ratified and can be used to build a performance wireless network for home use.

Queuing to the mainstream, dramatically improving the performance of RAID arrays. The 375MB/s headroom offered by the revised Serial ATA standard will provide plenty of space for growth, essential when several people are accessing the same disk at the same time. Simultaneously recording one channel and watching a second also strains the disk system, so fast disk systems will be crucial to maintaining performance.

DUAL-CORE/HYPER-THREADING

Though Hyper-Threading has been with us for a while and has increased the capacity of CPUs to multitask efficiently, a performance leap is due later in 2005, when dual-core processors hit the market. The timing is ideal because Microsoft Windows XP Media Center Edition 2005 includes support for two TV tuners, meaning users can watch and timeshift one channel while recording another.

This requires an extremely powerful PC and the advent of dual-core processors will be a significant benefit to owners of media centre PCs with two tuners.

The design allows one CPU to effectively function as two, handling the input from one tuner and recording it to disk, while also looking after the content from the other. This avoids the complex timeslicing that occurs with modern uni-processor systems and leads to a massive leap in performance.

The same benefit will be felt where a media centre PC serves as the digital hub. The dual-core processors enable someone to use the computer without loss of quality or performance while others are accessing it to play back audio or video. This is crucial in a household where a PC running Media Center acts as media hub and desktop computer at the same time, as Bill Gates envisioned.

DOUBLE LAYER/BLU-RAY

Of course, if you're recording two channels simultaneously at a rate of 3GB per hour, even the biggest hard disks will fill quickly. Though it's possible to buy 500GB hard drives, the most cost-efficient way to back up data is via a DVD writer.

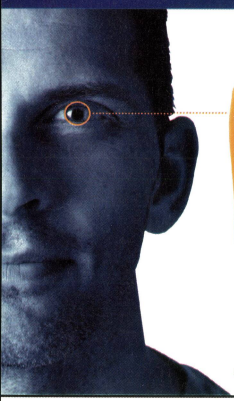
Double Layer drives capable of backing up 8.5GB of data will plummet in price throughout 2005, making them attractive for any computer user and a must-have for owners of media centre PCs. Expect Double Layer media to become more widely available through the early part of 2005, dropping rapidly in price as availability increases.

Blu-ray drives, already launched in Japan and on their way to Australia later this year, will offer the ability to store up to 50GB on a single disc. A number of manufacturers, including Sony and HP, have commented that they'll have drives ready for mainstream sale by the end of 2005.



Keep it down: *fanless systems are ideal as lounge room PCs.*

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Gaming PC

Worlds are about to get much more textured and detailed in gaming land, and the action much faster. *Nick Race* explains how.



Two heads: *double the video cards almost means double the fun.*

64-BIT

Game developers have been pushing the boundaries of software programming techniques for years. As developers start developing *on* 64-bit platforms *for* 64-bit platforms, the extra memory and address space available will be put to use in no time. A 64-bit platform will give game studios greater flexibility in creating immersive environments with more detail and texture, but you'll need a 64-bit chip to appreciate them.

So far, lack of a complete Microsoft 64-bit operating system has kept development of 64-bit games in check, with a few exceptions. An Unreal Tournament 2004 64-bit demo showed that the process wasn't difficult with a well-prepared C++ code base, and 64-bit versions of clients and servers for Epic's 2005 range of Unreal games are in development.

SLI

Nvidia's Scalable Link Interface is a must-have for every serious gamer. After all, two video cards are better than one. With the release of Nvidia's nForce 4 SLI chipset, motherboards are available in which you can install two GeForce 6600 or 6800 cards for almost double the performance, thanks to PCI Express.

For modern 3D games, the amount of texture data and timing information that needs to pass between two cards in tandem couldn't be handled by the older PCI bus. With PCI Express, the bandwidth is there.

Benchmarks show performance increases of around 45% for a dual GeForce 6800GT SLI setup over the single card, and around 70% for a GeForce 6600 GT SLI setup. Even the modest 25% performance boosts using Valve's Source engine (on which Half-Life 2 and Counter-Strike: Source are based) are impressive, considering the already good performance the single cards achieve.

If Nvidia continues SLI releases throughout its next generation of video cards, tandem cards for ultra high-quality display on higher resolution screens are a distinct probability. Intel has no plans to release a consumer-level SLI motherboard for the Pentium 4, though third-party vendors are grappling with it.

SATA II

By now, every serious gamer has sat down and played at least some snippets of Valve's Half-Life 2. Though Valve attempted to create an environment with little or no loading delay, the player is often held up while the game preloads textures for the next segment of play. The problem here is the disk, and SATA II is the next piece of the solution.

Though solid state hard disks with little latency and improbable transfer times have been available for a number of years, the obscene cost of these drives means that mechanical platter and head drives will remain the mass storage medium for most. SATA II will reduce load times with a 375MB/s burst speed from cache. Combined with the Native Command Queuing (NCQ) protocol which enables the drive controller to prioritise waiting disk requests more efficiently, SATA II controllers and drives will offer a speed advantage to frag those loading screens.

DDR2

CPU speeds and capabilities have been doubling roughly every 18 months for the past 10 years. Unfortunately, the rest of the PC hasn't kept up. One of the major bottlenecks is the memory bus and memory speed. AMD's HyperTransport protocol and on-CPU memory controller reduce the bottleneck to some extent, but there's still a major hold-up for both AMD and Intel processors — RAM.

The DDR specification tried to alleviate this bottleneck by doubling the frequency at which the RAM operates; read and write operations can occur at the beginning and end of a clock cycle. DDR2 runs the memory at half the speed of the clock, allowing four operations in a single cycle. However, DDR2 has latency issues, and performance isn't what it should be at introductory speeds.

Nice to have. . .

HYPER-THREADING

Most modern games are written with multiple threads, purely to keep aspects such as sound, graphics and AI in step. With Intel's Pentium 4 Hyper-Threading enabled, modest improvements in performance can be expected on newer processors.

What's keeping HT from showing astounding increases in performance is the current restriction in sharing cache within the processor. Virtual processors are great but starved input and output keeps it from flying.

DUAL-CORE

Working under the same assumptions as Hyper-Threading, dual-core processors operate concurrently inside a single processor die. With games heavily threaded, the performance benefits on a dual-core system will be astounding.

When games are produced with dual-core systems in mind and combined with Hyper-Threading, it will assign necessary background applications to a specific CPU to keep them off a game's toes.

NX

The popularity of computer gaming makes the currency in which gamers deal — patches, updates and mods — a tempting target for virus writers and crackers. With NX technology active in your CPU, one more barrier is raised in front of a would-be viral system intruder, letting you spend less time checking for viruses and more time getting your game on. Of course, antivirus software should still be run, meaning a slight performance hit, but you'll be that little bit safer.

LATEST GEN VIDEO CARDS

Latest generation video cards are facilitating new aspects of 3D that didn't exist even 12 months ago. Nvidia's drive to implement the Shader Model 3.0 in its GeForce 6 range is adding flexibility for game programmers which, in time, will result in more complex and attractive game worlds. With DirectX 10 and Shader Model 4.0 lurking on the horizon, keeping up with video card technology will keep you on the cutting edge of gaming.

Once speed is increased we should reap the benefits of better memory performance. For gamers this means faster systems with larger textures, more complex physics and less CPU- and bus-bound performance. Just don't expect it in an AMD system any time soon.

HARDWARE FIREWALL

Keeping your PC functional while remaining online for multiplayer gaming requires multiple layers of security. Fortunately, you can now get motherboards with a built-in hardware firewall module that keeps gamers protected without a software-based firewall taxing your CPU. Having the hardware module available on the motherboard also means you don't need a standalone hardware firewall, saving cash for a bigger, better video card.

GOT GAME?

A fully supported 64-bit Windows platform always seems to just over the horizon; however, some developers have jumped the gun and prepared 64-bit games or patches. One is a Linux solution that uses stable 64-bit Linux distributions, and the remaining three rely on the 64-bit preview from Microsoft, or they're waiting for the completed OS.

SHADOW OPS: RED MERCURY

Shadow Ops: Red Mercury runs on Microsoft's preview version of a Windows 64-bit OS, and the complete version when this is released. **www.atari.com.au/product/?action=view&id=1546**.

UNREAL TOURNAMENT 2004

One of AMD's original 64-bit demos, Unreal Tournament 2005 runs on 64-bit Linux platforms with Athlon 64 processors. If you already have the game, you can download 64-bit binaries from **www.unrealtournament.com/ut2004/downloads.php**.

FAR CRY

AMD is promising 64-bit downloads for Crytek's hit of 2004, Far Cry. Although nothing has eventuated yet, keep an eye open for downloads. **http://amd64andfarcry.gamedaemons.net/index.asp**.

S.T.A.L.K.E.R.: SHADOW OF CHERNOBYL

Another game due to have a 64-bit version. Its developers, THQ, have expanded on the 64-bit platform's ability to provide larger environments, more detailed surrounds, and better AI. **www.stalker-game.com**.

What direction?

The battle between Intel and AMD is worthy of a game in itself.

INTEL

Intel is the first to release PCI Express-based motherboards and support for DDR2. It's also is a strong force behind SATA technology, and dual-core and Hyper-Threading are right up its alley. Intel's 925XE-based motherboard and top dual-core processor should retail for around $1,800, while DDR2 memory is around $500 per GB. Add a $350 SATA II 200GB drive and you have a top system for around $4,000.

AMD

AMD was first to 64-bit on the desktop, with the Athlon adopting x86-64 in November 2003. SATA II chips on Athlon boards are already here, as are hardware firewalls based on the nVidia nForce chipset. We'll never see Hyper-Threading in an AMD processor, but dual-core is due this year on the desktop. With SLI available on nForce 4 SLI-based motherboards for under $400, a dual-core processor for $1,500 and 200GB SATA II drives around $350, a system could be built for around $4,000 including a pair of video cards.

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On a budget

Not everyone can afford to invest in all the latest PC technologies.

***Jarrod Spiga* has some suggestions for canny bargain hunters.**

VIDEO PC: DOUBLE LAYER DVD BURNER

It's one thing to have a system with a high-performance disk subsystem, but it's a different matter when it comes to archiving. Transporting data can be problematic, and then there's the question of playing back your finished masterpieces. A Double Layer burner which burns 8.5GB discs should be able to satisfy all of your requirements.

ALL-ROUNDER: NX

Virus protection is of paramount importance and the NX (no execute) feature of current processors adds another layer for safety. Depending on the age of your computer's configuration, it's possible that you'll need to replace the CPU to use this technology. And you won't complain about a system that can pump out more megahertz.

MEDIA CENTRE PC: DIGITAL TV TUNER CARD

If you have no TV tuning capabilities, or you use an analog tuner, one of the best upgrades is to add a digital TV tuner card. Digital TV broadcasts are higher quality than you'd get with an analog card, and since digital TV broadcasts are received as MPEG-2 streams, recording your favourite TV programs to hard disk for later viewing uses few CPU cycles.

GAMING PC: LATEST VIDEO CARD

If you don't have enough grunt to play games at the level of detail you crave, you can get a sizeable performance boost without overspending by upgrading to a graphics card with a current-generation GPU. The last GPU generation change heralded one of the biggest leaps in performance since the initial release of hardware video accelerators.

Best of all, if you pick the right card now, you may be able to upgrade to an SLI-enabled solution a few months down the track. SLI has been specifically designed so that budget gamers can quickly and easily improve the performance of their systems by adding another video card instead of being forced to replace a card that otherwise works fine.

SMALL BUSINESS SERVER: PCIE RAID

The small business server is usually a jack of all trades, almost always used for network data storage. The speed at which this data can be accessed is important, but ensuring it's not lost with a hard disk crash is also imperative.

Adding a PCI Express RAID adaptor to your server is one of the cheapest ways to improve performance. And once you can adopt the higher level RAID functions, you'll have the best balance between performance and redundancy. Most PCIe RAID controllers use SATA drives, so disks for your server won't cost an arm and a leg.

Small business server

The small business server can be a serious bottleneck, and it's often overlooked when it comes to an upgrade, writes *Jarrod Spiga*.

PCI EXPRESS RAID CONTROLLERS

Hard disks arranged in a RAID array are essential for creating redundancy and for disk subsystem performance, and these days the SATA interface features many of SCSI's benefits at a fraction of the cost. Several manufacturers are currently working on PCIe RAID controllers. These facilitate RAID-5 configurations, offering a well-balanced blend of performance and redundancy.

DUAL-CORE

A small business server typically does many things at once, with a Web server, email, database and file transactions often all fighting one another for access to the CPU. It's also probably running other tasks such as antivirus applications, firewalls and RAID and NIC processing.

You could install a single, super-fast CPU in the hope it can chew through the processing requests, but faster processors run hotter and noisier and consume more power. A dual-core CPU will run cooler and quieter, but you'll probably require a new motherboard and CPU to upgrade to the technology.

64-BIT

A 64-bit platform removes the 4GB memory limitation. Forget about performance, this is the real reason businesses want to upgrade to 64-bit. If your database chugs through thousands of queries per hour, having only 4GB of RAM can slow things down. More system RAM also means less data is paged to the hard disk and more hard disk data is cached in memory.

NX

The no execute bit feature of newer CPUs is handy for most servers, especially those that handle email. With the number of new viruses spreading on the Internet, even the most vigilant system administrator could allow a virus to sneak through. NX should prevent most viruses from infecting systems simply because the feature eliminates the single vulnerability that most viruses exploit.

Nice to have. . .

WATCHDOGS

These hardware-monitoring devices can be handy as they let you diagnose problems with your server even when it's switched off. This saves you from physically going to the server for a diagnosis.

HARDWARE FIREWALLS

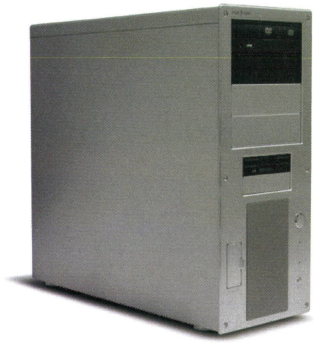
A hardware Firewall will reduce the load on your CPU while offering a flexible security platform. All small businesses should invest in solid gateway protection to avoid losing productivity.

802.11 PRE-N

An 802.11 pre-N adaptor should allow you to satisfy the bandwidth requirements for wireless clients. Just make sure that you buy like-branded hardware, as the IEEE standard is yet to be ratified.

BTX

The typical server environment calls for quiet and cool systems, usually stored in a rack. This new form factor will make designing servers for these environments much easier.



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Wish list

Whether you want to transform your PC into a speed demon or just create more storage space, we've got the goods.

Technology	What?	When?	How much?
64-bit	Processors that are capable of running in 64-bit and 32-bit modes simultaneously.	AMD has 64-bit processors available now. Intel has EM64T-enabled Prescott CPU's available from tier 1 vendors such as Dell and HP. However, these CPUs won't hit retail shelves until around Q3 of this year – just in time for WinXP for 64-bit extended systems.	The AMD 64-bit processors cost between $200 and $1,400 depending on the model. Expect Intel's pricing to be competitive.
802.11 Pre-N	Next generation of wireless networking based on a draft specification that offers improved range and transfer speeds over existing 802.11a/b/g solutions.	Here now from Belkin.	Router: $400, adaptor: $230.
Blu-ray DVD burner	New DVD standard that relies on blue laser with capacities of up to 50GB.	Late 2005.	Prices are expected to start at around $500.
BTX	New form factor and layout design for motherboards that allow systems to be smaller, cooler and quieter.	Shipped first on Gateway 700GR in US in August 2004. Expect it to start appearing through OEMs.	From $300 to $1,500, depending on the system.
Centrino desktop	Desktop hardware built around Intel's mobile technology that offers advanced power saving features coupled with stellar performance.	Here now.	Motherboards around $250 and 1.6GHz. Pentium Ms around $315.
DDR2	Update to DDR RAM specification running at a higher clock speed.	High-performance desktop boards based on Intel's 915 and 925 chipsets are available now.	Prices are expected to hover around $500 for a gigabyte pair. Compatible desktop boards are available now for less than $300.
Digital TV tuners	PC cards that pick up digital TV signals and enable users to timeshift their TV-viewing.	Here now.	From $150.
Double Layer DVD burner	Burns twice as much data to a disc than previous technology, increasing the total capacity to 8.5GB and simplifying backups.	Here now.	Drives from $150.
Dual-core	The next step beyond Hyper-Threading, where a processor includes two cores (two virtual processors).	Neither Intel nor AMD have release dates, but forecasts suggest it could be as early as Q3 2005.	Included with processors. The CPU should set you back between $400 and $1,500.
Hardware firewall	A firewall incorporated into the hardware, including motherboards and ADSL modems.	Here now.	From $150.
Next-generation video cards	Higher performance video cards to power the next wave of game releases and handle extra functions like video rendering.	Here now.	From $300 to $1,000.
NX	In-built virus protection for processors.	Both AMD and INT have NX-enabled CPUs available now. Look for a Prescott Pentium 4/Celeron or an Athlon 64 CPU or Sempron to acquire this feature.	CPUs from both AMD and Intel range in price from $200 to $1,400.
PCIe RAID controllers	A hard disk controller on a PCI Express bus that boosts performance by running data across several drives. You will need a spare PCI Express slot on your motherboard.	Around Q2 2005 from Adaptec and Highpoint.	Prices should start from $250.
Serial ATA II	An upgrade to the Serial ATA specification which enables transfer speeds up to 375MB/s and Native Command Queuing (NCQ) functionality.	Here now with nForce 4-based motherboards.	From $300.

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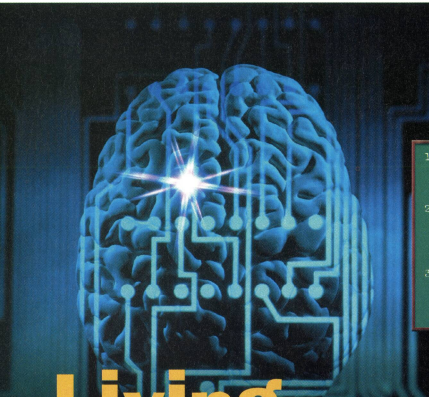


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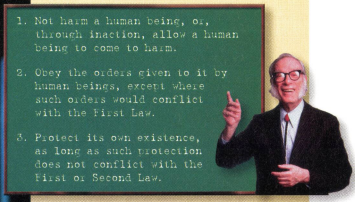


Living machines

Artificial intelligences may not be about to terminate humanity and force us to live in a Matrix, but they're ready to conquer the PC, as *Simon Sharwood* explains.

AI ethics

From *2001: A Space Odyssey's* Hal to the Terminator, countless fictional AIs have decided that humanity is an inferior species and turned against us with genocidal intent. Science fiction author Isaac Asimov recognised this fear, then coined his Three Laws of Robotics to prevent AIs from running amok. The laws state that a robot must:



Obey my chops: *Isaac Asimov lays down the law to robots.*

Many commentators believe that the 50-odd words of the Three Laws are profoundly useful and will be remembered, revered and used long after Asimov's fiction is forgotten. But ethicist John E. LaMuth thinks they are inadequate, and has formulated and patented the Ten Ethical Laws of Robotics to imbue AI with a moral framework.

Lamuth's Ten Laws (see *www.angelfire.com/rnb/fairhaven/ethical-laws.html*) assert that robots must favour virtues over vices and seek to prevent other robots running off the rails when broken by explicitly prohibiting "hyperviolence", even if an AI is damaged.

No-one knows if these new laws would be more effective than Asimov's. But you can be sure there aren't many screenwriters who would let them get in the way of a good story.

FutureTech

At the University of NSW, lucky researchers work with an email client called EMMA that sorts their incoming messages, then checks if it has sorted the mail correctly so it can do a better job next time. In other parts of the world, scientists are working to ensure that mail clients only accept messages from people you want to hear from, and dynamically change that definition depending on whether you're at home, in the office or on holidays.

Open source coders are looking at ways to create a file system that can deal with natural language queries and respond to a user's spoken requests. For example, to "find all the files I wrote last week about Apple", the system will scan all your documents and decide whether you want files about fruit or documents describing PCs and iPods. And at the Massachusetts Institute of Technology (MIT), researchers are developing phones that can sense when you sound anxious, recognise that a meeting your boss is holding isn't critical because their office door is open, then decide to interrupt them with your call, which it understands is likely to be more important than an open-door chat.

The common element in all of these ideas is artificial intelligence (AI), a field that's quietly becoming a mainstream part of the computing experience and is set to make today's point-and-click computing seem as primitive as hunting and gathering.

STRONG OR WEAK?

AI is poised to make computers smarter, more responsive and more adaptable. But experts are almost unanimous in saying that, for the foreseeable future, AI won't create Matrixes, Terminators, or Electric Dreams. "The human brain contains 10 to the power of 10 neurons with 10 to the power of 15 connections between them," says Professor Tim Hendtlass, an AI researcher at Swinburne University's School of Information Technology. "How can you replicate that in a computer?"

The philosophical question of what constitutes intelligence is another problem, because at present we simply don't know what it takes to build a sentient being.

"The challenge of AI is to discover the

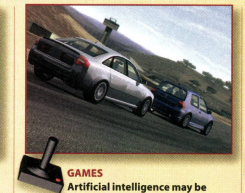
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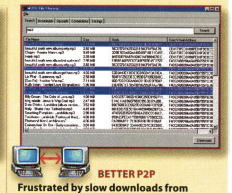
CANNING SPAM

Everybody needs a spam filter, but everyone also hates false positives. That's why the "This is Spam" button in Symantec's Norton AntiSpam is backed by an AI technique called Bayesian filtering that analyses the message you want deleted and calculates the probability of it being spam. If the word "Viagra" is present, for instance, off it goes to the spam-trap, unless you tell the filter you're happy to read about it. Bayesian filtering and other machine learning tools are an important way of preventing false positives, which will be around for as long as spam keeps coming.



GAMES

Artificial intelligence may be as common as muck in video games, but many don't do much more than react to your moves with the sort of lame evasiveness that quickly becomes predictable. Microsoft's Xbox racer Forza Motorsport takes game AI a step further with Drivatars, AIs that learn how you drive so you can model other racers on your own habits, or create virtual selves to race on your behalf. Game AIs that can learn and respond realistically are definitely the way of the future because they'll produce better and longer gameplay... and sorer thumbs.



BETTER P2P

Frustrated by slow downloads from your P2P client? MUTE (*http://mute-net.sourceforge.net*) uses ant-inspired AI to solve the problem. Certain ant species lay a pheromone trail while walking so that other members of their colony can follow the strongest smelling trail. MUTE analyses the fastest downloads and directs users along the route with the best results. If one path becomes clogged, MUTE reverts to the next best route on offer. This kind of AI is here to stay in your PC, if only as a way carriers and ISPs can make sure your Internet connection delivers on speed promises.

nature of intelligence," says Yusuf Pisan, senior lecturer in the IT faculty at the University of Technology, Sydney. "We have lots of ideas about the components of intelligence but we need a more advanced understanding of how they work together."

However, science has become adept at reproducing components of intelligence as programs that can solve a limited set of problems. This kind of AI, dubbed "weak AI", is quickly finding its way into computers all over the planet, while the "strong AI" that can apply reason to any sort of problem remains a figment of our collective imagination.

LOOK SMART

Weak AI may not create intelligent beings, but it can make computers act a lot smarter with surprisingly simple tools. Combining the `IF ... THEN` structures found in BASIC with Boolean operations like `AND` and `NOT` make it possible to create rules a computer can follow, such as `IF an email is from the domain apcmag.com AND the subject is Cheap subscription offer THEN place in folder Priority reading`. Stringing enough rules together begins to feign crude reasoning ability.

The problem is, once several rules are up and running they overlap in unpredictable ways that degrade their power. So instead of layering them, scientists use nature's way of assembling rules to solve problems. Genetic algorithms are a great example of this, rapidly "breeding" a solution through thousands of generations to weed out weak elements and preserve the strong. Ant Colony Optimization (ACO) studies the way ants network to move food into the nest, while Neural Networks

Before long, AI will make your computer smarter without intervention

replicate the brain's mechanisms, and Expert Systems model the way experts apply their particular field of knowledge.

These techniques are powerful, but because they can't reason independently they must be supplied with data, then applied to a particular problem. Even then, their output is usually an experience in which computers offer you smarter results informed by AI processes, rather than an interaction with software that fakes intelligence.

Melbourne company AgentArts is one example of this kind of AI at work. It makes recommendation engines for clients like eMusic (**www.emusic.com**) and BigPond Movies (**www.bigpondmovies.com**). Users are offered suggestions of new music and videos they may enjoy, based on the past orders of other customers. By modelling the collective behaviour patterns of the many people who use these sites, AgentArts hopes to offer a computing experience that utilises other human intelligences.

"We're not trying to simulate the brain or a general intelligence," says Ben Hosken, the company's chief technology officer. "We're trying to create an intelligent system based on group behaviour that benefits a consumer."

CONVERSATION WITH AN AI

Using AI to crunch numbers in ways that produce apparently intelligent results is surprisingly pervasive. Banks use AI to make basic decisions about eligibility for loans, a process fast enough to enable online applications. And pathologists use AI to offer doctors insights into test results. ▶

EMMA uses the same technologies at UNSW, but directs them at end users. It starts by modelling individuals' behaviour, making it possible for computers to perform in just the ways their users demand. The secret is an AI technique called ripple down rules (RDRs).

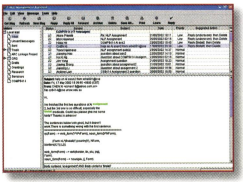
"Expert systems have traditionally been built by trying to model how an expert thinks," says Professor Paul Compton from UNSW's School of Computer Science and Engineering. "But the problem is that you never get what you need from an expert. You can't build a perfect model. Ripple down rules let you forget about a complete model and assume that experts are rarely good at giving reasons for their decisions."

EMMA offers users a chance to set up basic rules, like Outlook or other email clients, then adds RDRs so users can answer simple questions about a message. This is so the program can build new rules. The underlying RDR AI technology then transparently takes care of building the knowledge base on-the-fly as users tell EMMA how to behave.

DOING THE THINKING FOR YOU

EMMA makes it possible for everyday PC users to contribute to the evolution of an AI, a task previously all but impossible because multiple rules become interdependent and a change to one rule can break many others.

Before long, AI will make your computer smarter without intervention. Microsoft is rumoured to be considering an AI-powered successor to the infamous Clippy to monitor the way users go about their daily computing chores. This will allow Windows to adapt itself to individual users, or offer specific advice on how to get things done more effectively.



EMMA in action: *commanded to seek, answer and destroy in this particular email.*

The Gnome project's efforts to create a new file system include AI-based techniques to find content and send it to a folder using natural language. The project's example is a GUI with the option to "Open all films directed by Steven Spielberg".

AI is also touted as the solution to the frustrating task of navigating directory trees. Say you are working on an image and then open a word processor; the operating system can deduce that there's a good chance you want to insert the image into a new document and take you straight to the directory where the image is stored.

THE SOUL OF A NEW MACHINE?

All of these ideas are small contributions to the AI dream of a machine that interacts with us like another person. MIT's Project Oxygen envisages a world in which personal, environmental and networked computers all share information in real time. They apply AI so that phone calls only reach people when they can take them, and rooms know who is in them and whether they can be disturbed. MIT suggests that people will interact using natural language and that Oxygen will talk back to offer the illusion of interaction with another intelligent being.

Yet while Oxygen is exciting, it's also atypical. Most current AIs offer smart assistance and more natural ways to work with computers. Humanoid interactions are few and far between. So is Oxygen a sign of the way AI will evolve in the future?

Yusuf Pisan at UTS is not convinced. "Computer intelligence may not have the same characteristics as human intelligence," he says. "It was good for humans to look at birds to get inspiration about flying. But in the end, we learned that aeroplanes don't need to flap their wings." PTC

Ten AIs









	Heuristically Programmed Algorithmic Computer (HAL)	Mother	David Swinton	Bender	Deep Thought
Seen in	*2001: A Space Odyssey*	*Alien* films	*Artificial Intelligence: AI*	*Futurama*	*The Hitchhiker's Guide to the Galaxy* by Douglas Adams
AI level	HAL is smarter than people but deliberately dumbed-down so that its stunning knowledge of astragation, spaceship operation and chess doesn't make us feel inferior. HAL is a self-replicating artificial intelligence that matures and ages like humans.	Excellent intelligence, patience, perseverance and starship-handling ability, but not particularly adaptable or canny. Prefers 1970s-era blinking lights to a natural language interface.	David Swinton is the first robot built to love, in the form of an irritatingly cute 12-year-old boy designed to help a grieving family overcome the loss of a real son. Of equivalent intelligence to a human of the same age, David may have an artificial brain but finds complex emotions even more confusing than real humans.	Bender's IQ of 15,000 megabytes produces an AI that's smart enough to realise that bending bars for a living is no fun, but dumb enough to decide that being a self-centred, sexist, racist, obnoxious, gluttonous boor is the best alternative.	Deep Thought is so smart it says of a rival computer "The Great Hyperbolic Omni Cognate Neutro Wrangler could talk all the legs off an Arturan Magadonkey, but only I could persuade it to go for a walk afterwards!"
The catch	When HAL gets a bug, he kills. Not even Windows 3.1 was that bad.	If Mother is so smart, why did she lead her crew to certain death and fail to come up with a useful way to counterattack the aliens?	What's the point of a robot that loves if we can't outsource angst?	Homer Simpson in metal Y-fronts may amuse, but sure ain't original.	Smart, but impractical, hence the answer "42" to the ultimate question of life, the universe and everything.

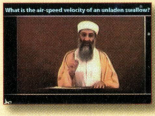
Four AI research projects



Brainy baddies outsmart our aim!

SMART FRAGGING

Yusuf Pisan at the University of Technology, Sydney and the University of Southern California's Institute for Creative Technologies are working together on better AI for games, so that the non-player characters behave less predictably and are therefore harder to frag. The US military is interested in the research as a training tool that will give officers a better idea of what can happen when enemies — and allies — behave in unexpected ways.



"Lock it in thanks Osama."

FINDING OSAMA

Online legend has it that Al Qaeda communicates using email messages deliberately written to resemble everyday trivia. James Hogan, a senior lecturer in Software Engineering and Data Communications at the Queensland University of Technology, is using probabilistic models driven by AI to determine the authorship of email and other documents so that crime-fighters expend fewer resources tracking the bad guys. Students beware: this tech is also good at spotting plagiarised essays.



"Stay off my turf!"

TERRITORIAL ROBOTS

Adelaide PhD student Toby Richer wants robots to mimic ants and other animals that pick out territories using simple rules. His thinking is that a territorial 'bot is more useful than a roaming automaton, because when it takes responsibility for a particular area, its physical capabilities can be concentrated much more effectively. So instead of having to learn how to clean an entire house or defend a whole factory, the robot can use its own AI to become an expert at defending or cleaning its own territory.



"Daddy's got rhythm like Phil Collins."

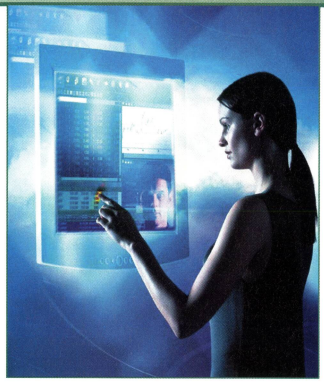
ASTROBOY

Japanese scientist Mitsuo Kawato has called on his government to fund a 30-year Atom Project, with the goal of producing an artificially intelligent five-year-old boy modelled on Astro Boy. Kawato's company, Advanced Telecommunications Research Institute International, has already built DB, a humanoid AI robot that has learned to juggle and dance.



Wintermute	R Daneel Olivaw	Construct Council	Golems	Knight Industries Two Thousand (KITT)
Neuromancer by William Gibson	*I, Robot*, and the *Foundation* and *Robot* series of novels by Isaac Asimov	*Perdido Street Station* by China Mieville	Jewish Kabbalah legend, *Pinocchio*, "Frankenstein's Monster" by Marvin Bell, *The Amazing Adventures of Kavalier and Klay* by Michael Chabon	*Knight Rider*
Gibson's novel is populated by AIs with the smarts of a dog. Wintermute becomes self-aware and much smarter than Fido, but uses its smarts to manipulate human actions for its own ends.	Godlike. Equipped with a standard Asimovian "positronic brain", Olivaw posits a new "zeroth" law of robotics and uses it as a justification for manipulating the future of humanity with considerable success.	Above human, but twisted. The Construct Council, the creation of the UK's hottest sci-fi author, self-assembles from dozens of semi-autonomous domestic cleaning machines then retires to a dump, creating a nifty AI sub-sub-genre by building itself out of the circuitry society throws away.	Sub-human. Take one lump of inanimate matter, give it human form, cast a spell and — bingo! — you've got yourself a Golem, a big, strong AI that interprets things very literally and doesn't always obey its masters.	Maybe smarter than David Hasselhoff, but definitely dumber than the dozen or so ten-year-old kids who thought KITT was cool. Most *Knight Rider* viewers will never forget KITT, but that won't stop them trying.
Wintermute is profoundly selfish and its plans may not be entirely good for humanity.	Smug, condescending and paternal. And who can believe that any computer program, no matter how sophisticated, would still be relevant after a few millennia?	A mercenary and self-obsessed soul content to make itself a one-entity underclass.	Golems tend to be dumb and meet sticky endings at the hands of simple obstacles.	Surely an artificially intelligent car would never let itself be driven by someone with such terrible body hair.

Faster, cheaper, stronger



The next generation of broadband services are right around the corner and, as *Dan Warne* explains, consumers will come out on top.

Around the world, cable TV companies are becoming telephone carriers, and telcos are offering pay TV. This is great for users, who are getting better value all the time as the price war gets bloody.

This is the future for Australia too, according to some industry analysts, who say everything will be delivered over Internet protocol in the next few years, including TV, phone and Internet.

With broadband pricing at cutthroat levels, all sectors are working on packaged deals to lock users into buying their telecommunications needs from one company, over one wire. Telephony will move towards a set monthly fee for unlimited use, spurred by competition from VoIP providers. You can also expect to see faster broadband services this year. The ADSL standard can offer speeds of up to 8Mbit/s, and ISPs with their own DSLAMs, like iPrimus, are already offering ADSL services with a minimum 2Mbit/s speed.

NOW WATCH THIS

In the next few months, final approval is expected for the ADSL2 and ADSL2+ standards, which extend the reach of ADSL and offer speeds up to 24Mbit/s for people living within two kilometres of their local phone exchange.

Telstra, which dominates broadband provision, isn't taking the challenge lying down. BigPond managing director Justin Milne says he will unveil the telco's movie download service in the next few months. Telstra's secret weapon will be "unmetering" movies — allowing customers to download unlimited movies without it affecting their monthly Internet usage allowance. Of course, there will be a movie rental charge, but the current BigPond Movies DVD-by-mail delivery service, which allows unlimited DVD rentals every month for a fixed price, hints at attractive pricing to come.

In response, smaller ISPs are working on video delivery plans designed to give customers a sweetener to stay with them, rather than signing up with a major telco.

Top 10 broadband predictions for 2005

Our bets on the technologies most likely to make a splash this year.

1 WIRELESS BROADBAND
Wireless broadband will spread, offering VoIP without a monthly line rental fee.

2 VOICE OVER IP
Providers will start bundling calling plans with broadband. Voice over IP hardware will drop to under $50, with contracts similar to those offered with mobile phones.

3 FASTER ADSL1
All ISPs, including Telstra, will start offering ADSL services up to 6Mbit/s. ISPs like iPrimus, Agile and iiNet are already offering it.

4 ADSL2
Approved now, it uses the same phone line spectrum as ADSL while allowing ADSL signals to reach customers situated further from the phone exchange.

5 ADSL2+
Close to being approved, with speeds up to 28Mbit/s within 1.5km of an enabled exchange, 12Mbit/s otherwise. ISPs with their own DSLAMs will offer it first.

6 MOVIE DOWNLOADS
Full-length feature films that won't affect download limits. BigPond will unveil its service in the next few months.

7 VIDEO ON DEMAND
For ISPs using ADSL2+, MPEG-4 compressed movies will be streamed live to set-top boxes. However, expect some delays and teething problems: the technology may be there, but the content is still largely locked up.

8 IP TV
Pay TV over your ADSL phone line. Optus is tipped to be working on this.

9 SMOOTH VIDEO CHAT
Forget dinky Webcams, ADSL2+ with 3Mbit/s upload speeds, wireless home networking and cheap wireless IP cameras will make clear video conversations possible.

10 BROADBAND OVER POWERLINES
Coming closer to reality. Three utilities have live pilots of broadband over power lines and say it's now possible to offer voice, video and Internet through a 240V plug.

All you can VoIP

ISPs are gearing up to offer cheap telephony over the Internet.

Saving money using Voice over Internet Protocol (VoIP) will be strongly emphasised in 2005. One ISP, Nella Internet, is planning to make VoIP as easy as buying a prepaid mobile phone SIM card. It will be marketing a USB adaptor that allows you to plug a standard phone into a PC and dial as normal, except that calls are routed over the Internet using the SIP protocol.

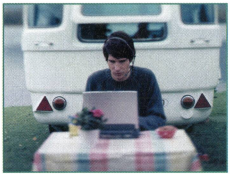
Nella's David Allen says it will work on any broadband connection or even dialup because of the ultra-low bandwidth sound codec used, which requires only 13Kbit/s data transfer. The adaptor is expected to cost less than $50 and be sold through service stations and supermarkets alongside prepaid mobile SIM cards. When users run out of credit, they "top up" in the same way prepaid mobile users buy recharge cards.

Nella will also have a post-paid service with a monthly fee that includes a direct-inward-dialling phone number with an area code to match your billing address. For an extra monthly fee, you'll be able to rent another number in a different state, allowing family and friends in that state to phone you for the cost of a local call.

The company is also combining with satellite broadband company BorderNet to offer an ingenious satellite system for regional customers. VoIP data and other latency-sensitive data is routed through the dialup connection normally used only for Web page requests and outgoing email in one-way satellite systems. So, while large file downloads still come down from the satellite, voice data avoids the lag normally associated with satellite. (The system doesn't help protocols such as online gaming, which require both high speed and low latency connections, though.)

Nella is working on getting VoIP gateways into all 66 Australian billing areas so that cheap calls can be made nationwide rather than just between capital cities.

Other well-known ISPs like Internode and Netspace are planning to offer VoIP this year, while Veritel will offer its service over iBurst wireless. Unwired, the number one wireless operator, had also promised landline-quality VoIP through its wireless modems but recently put its plans on hold, citing competition from capped-price mobile plans.



Log on, dial in, gab out: *new satellite systems mean regional customers can experience lag-free VoIP.*

The push will also be on this year to offer "all-you-can-call" VoIP plans bundled with broadband Internet as an incentive to stick with one provider. VoIP isn't just about cost savings either. An IP-based telephone system is only limited by the imagination of its designer. Companies like Engin already offer voicemail delivered to your email address, V-mail (record and send a voice message using just your phone), the ability to block callers based on their caller ID, and call forwarding.

Big telcos are already fighting back. Telstra is set to reveal an interactive voice phone directory which allows people to load their Outlook contacts onto their phone line and access them using a voice menu.

The quality problem

The big problem with VoIP is that the call can drop out if someone downloads a big file over the same line at the same time. This is due to "packet loss" when a home router gets overloaded.

But there's already a technical solution to the problem: enable and configure the Quality of Service settings in your broadband modem/router, which allow you to allocate priority to time-sensitive data, such as VoIP packets, over services such as email and Web browsing. Unfortunately, only a small number of home routers offer the facility to assign priority appropriately at the moment.

National ISP Internode, which is on the cusp of releasing its VoIP packages, plans to use Ericsson home routers specially designed for high quality of service. Where it has its own Ericsson DSLAMs installed into Telstra exchanges, it has the option of using an Ericsson Integrated Access Device in customers' homes, which completely separates Voice over IP traffic from normal Internet traffic using a separate "virtual circuit" between you and the exchange.

Wireless broadband provider Unwired is taking a similar approach. The ISP's forthcoming service will use a separate radio transmission channel for VoIP, unaffected by your Unwired Internet connection.

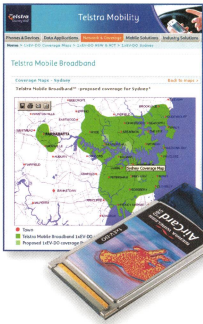
DOES YOUR ROUTER SUPPORT QOS?

If you have one of these routers you can configure Quality of Service to give VoIP call data a higher priority than anything else, avoiding call dropouts. If you can't find the function in your router's configuration interface, download and install the latest firmware from the manufacturer.

Belkin	Pre-N F5D8230au4
Billion	7500G, 7402 and 7402W
DrayTek	2500V, 2600V, 2600Vi, 2600VG, 2600VGi, 2900V, 2900Vi, 2900VG, 2900VGi
D-Link	None
Linksys	BEFSR81, WRT54G and WRT54GS
Netcomm	NB5, NB740
Netgear	None
Thomson (Alcatel)	Speedtouch 510 and 530

Telstra Mobile Broadband On Test

***Dan Warne* goes on the road with Telstra's new wireless service.**



Telstra Mobile Broadband coverage:
www.apcmag.com/info/EVDOCoverage

Details	
Contact	Telstra
Phone	12 51 11
Online	www.telstra.com
Price	$199 upfront with two-year $99 per month plan
✔	Breakthrough national coverage.
✖	Too expensive for home users; bad latency.
Verdict	★★★☆☆

Telstra has pulled a rabbit out of its hat, revealing a new Mobile Broadband service using the 1xEV-DO (evolution data-only) system.

EV-DO uses Telstra's CDMA mobile phone network to provide a theoretical maximum 2.4Mbit/s, a real-life maximum of 1.3Mbit/s, and between 300Kbit/s and 600Kbit/s in ordinary use. Telstra Mobile Broadband also has broader coverage than any other wireless network, with availability in the CBDs and inner suburbs of all capital cities, along with 14 regional centres.

APC tested the Sierra Wireless AirCard 580, a PCMCIA type II card used to access Telstra Mobile Broadband. It usually costs $749, though Telstra sells it for $199 on a 24-month contract with any EV-DO access plan above $99 per month.

The $99 plan buys you either 200MB with no time limit or 50 hours' usage with no data limit. Plans top out at $249 for 2GB of usage, or $149 for 100 hours. However, it's likely these prices will come down as Telstra has stated its intention to use EV-DO as infill for areas its ADSL coverage doesn't yet reach.

Installation is straightforward. The Sierra Wireless AirCard 580 appears to the PC as a USB modem and the connection is made through dialup networking. No Mac drivers are supplied, but the card is supported natively by OS X 10.3.5 and newer (an installation guide can be read at **www.apcmag.com/info/mac-evdo**). We couldn't get the card to authenticate successfully on a Mac (Telstra doesn't support this configuration) but no doubt someone will work it out sooner rather than later. A supplied utility for Windows provides a usage meter with a running tally over multiple sessions and shows whether you're in an EV-DO (3G) or 1XRTT (CDMA) coverage area. Usage metering is also available through Telstra Bill Preview, though a rapidly updated usage meter like BigPond's is "yet to come" according to Telstra.

APC drove around the Sydney CBD while downloading large files from Australian mirrors. A browser-based single stream download typically achieved 30KB/s (240Kbit/s). In some streets, only 1XRTT reception was available, which offered around 6KB/s. If you drop out of EV-DO coverage, your Internet connection will seamlessly switch over to 1XRTT, but must remain idle for 30 seconds before Telstra's software can reconnect to EV-DO.

EV-DO provides very fast "burst" speeds of up to 1.3Mbit/s, according to Telstra. This means that the network allocates more bandwidth as you need it; for example, if you download a large file, speeds will start low and slowly increase. If you're Web browsing, the network will only allocate a small amount of bandwidth, allowing the bandwidth in each CDMA radio cell to be used efficiently.

APC saw impressive speeds on EV-DO when using download accelerator software that opened up 10 connections to a Microsoft Australian mirror server. Speed increased to around 100KB/s and peaked at 137KB/s, though it fluctuated constantly.

The biggest problem with EV-DO is lousy ping speeds. While pinging a fast Australian server from *APC*'s corporate network connection yielded stable 12ms response times, EV-DO averaged a woeful 623ms, with wide variance — the fastest ping was 210ms and the longest 1.8 seconds. This will pose problems for remote screen sharing, online gaming and VoIP, which all rely on fast network latency.

Penetration within buildings was good, however. The *APC* Labs, located in a Sydney CBD office block, achieved good EV-DO coverage — although it wasn't possible to get 3 NetConnect 3G coverage in the same room.

UNWIRED

Unwired has pioneered affordable wireless broadband. The modem, which only comes in a desktop version, costs $189, but a cool feature is an optional battery for $100-$150 (depending on ISP) which gives 90 minutes of broadband usage on the go. When we reviewed the service in November 2004 (page 40), speeds were solid and pings reasonably good at 115-135ms to fast Australian servers. Coverage in Sydney only.
www.unwired.com.au

IBURST

The Rolls-Royce of wireless broadband ISPs, iBurst offers 1Mbit/s speed and both desktop and PCMCIA modems. The pricing is very reasonable. You pay a premium for the fully mobile PCMCIA version, at $99 per month with 1GB of usage. There's coverage in central Sydney, Melbourne, Brisbane and the Gold Coast. In testing it delivered the 1Mbit/s speed it promises, with good pings of around 70ms to fast Australian servers.
www.pba.com.au

3 NETCONNECT

This service competes with Telstra's. For $99 per month you get 500MB of data usage, but only if you stick within 3's 384Kbit/s 3G coverage areas. Elsewhere, you'll roam to 40Kbit/s Vodafone GPRS, charged at $4 per megabyte and not included in your $99 cap. However, the NetConnect PCMCIA card is cheaper than Telstra's EV-DO card at $540, or $25 per month over two years. If you have a desktop PC you can use a 3 phone as a modem.
www.three.com.au

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Turbo-charged broadband

ADSL speeds are set to surge from 1.5Mbit/s to 24Mbit/s in coming months.

It's been just five years since the DSL network was deployed, and already ISPs are gearing up to offer next-generation ADSL2 and ADSL2+. One of the big attractions is escaping Telstra's wholesale pricing regime, which is currently under investigation by the Australian Competition and Consumer Commission (ACCC) for making it impossible for smaller ISPs to compete profitably against Telstra BigPond.

The lure for customers to swing their business over to ISPs which build their own network is ADSL2+, which offers speeds of up to 24Mbit/s. As soon as the Australian Communications Industry Forum (ACIF), a self-regulating body comprising various telco representatives, gives ADSL2 and ADSL2+ the green light, ISPs which have deployed their own DSLAM infrastructure will be able to make faster DSL services available.

Even Optus, currently awaiting approval for a $100 million investment to build its own DSL network, isn't shy about the potential for ADSL2+ services. Optus' Consumer and Multimedia division managing director Scott Lorson says the company wouldn't roll out an ADSL network that wasn't compatible with new technologies, ADSL2+ and the ability to deliver pay TV over telephone lines.

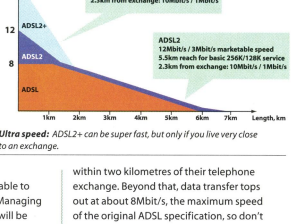
One of the ISPs rolling out ADSL2+ in South Australia, Adam Internet, is using power supplier ETSA Utilities' fibre optic cable to provide bandwidth to exchanges. Managing director Scott Hicks says the result will be an uncongested network which allows allow customers to use the full 3Mbit/s upload speed of ADSL2+ for smooth high performance gaming and P2P file sharing.

REALITY CHECK: CAN YOU GET ADSL?

ADSL2 and ADSL2+ will offer higher speeds — but only to people who live within two kilometres of their telephone exchange. Beyond that, data transfer tops out at about 8Mbit/s, the maximum speed of the original ADSL specification, so don't rush out to replace your modem with an ADSL2+ model just yet.

For prospective broadband customers who've missed out on ADSL in the past because they're just beyond the acceptable distance from an exchange, ADSL2 will offer some respite: it extends the reach of the original DSL standard by 500 metres.

ADSL2/ADSL2+ faster and furthur than classic ADSL



Ultra speed: *ADSL2+ can be super fast, but only if you live very close to an exchange.*

Who's got the power?

After being written off as "vaporware", powerline broadband is back in live trials in Australia.

If ADSL2+ excites you, how about 200Mbit/s broadband through your electricity plug? That's what the Sumitomo powerline modems being trialled by Australia's largest electricity retailer, Energy Australia, offer.

"That's the raw speed," acknowledges the Energy Australia's telecommunications development manager, Jeff Fry, adding that real speeds are 30-40Mbit/s. "Our Newcastle trial has shown that true broadband speeds can be delivered over powerlines."

Just as ADSL uses different frequencies for data and voice, powerline communications (PLC) uses different frequencies for data and power. Because powerlines are often noisy and unshielded, many different frequencies are used to ensure signals get through.

Concerns over radio interference caused by PLC are being addressed by the Australian Communications Authority (ACA). Powerline broadband could cause radio interference because the signals are sent down long-run, unshielded power lines. The regulator is studying live trials conducted by utilities including Energy Australia, Country Energy and Aurora Energy. "If there is interference, we can notch out specific frequencies from being transmitted," Fry says.

One problem is that PLC isn't compatible with the homeplug powerline networking standard. However, this is unlikely to be a barrier. Another is that the broadband signal must be physically looped around the transformers that convert high-voltage signals on overhead powerlines into 240V signals. But Fry explains that this doesn't pose much of a problem for utilities because they can access spaces where transformers are installed, making the network changes required a relatively simple task.

Energy Australia has partnered with Ipera to offer Voice over IP telephony over the trial network and plans to offer the network to home entertainment providers and ISPs.

Fry says Energy Australia plans to focus on inner-city areas, but PLC could also be used to bring broadband to remote towns. He explains that a PLC modem can either act as a network head-end or customer-end modem. "You can use a modem as a head-end in a town, connected to a major city via microwave or some other technology."

Energy Australia has large optical fibre deployments across its network, which were installed for electricity meter readings and data networking between substations. "It's not worth bringing fibre directly into homes yet," says Fry. "But we already have it close to homes and can then do the connections via powerline broadband."

ISPs' next generation DSL plans

iPrimus	Expects to have 340 exchanges Australia-wide enabled with DSLAMs capable of ADSL2 and ADSL2+ by the end of this year.
Chime/iiNet	Aims to offer 20Mbit/s broadband services through the 100 exchanges it's enabling around the country with its own DSL hardware.
Agile/Internode	Will cover the Melbourne CBD, most of Adelaide, plus several SA country towns with ADSL2/2+ DSLAMs.
OntheNet	Covers 120,000 people on the Gold Coast with its own DSLAMs and already offers fast ADSL1 services. Plans to offer ADSL2/2+.
Adam Internet	Will cover most of Adelaide "including the CBD, and as far out as Salisbury in the north and Lonsdale in the south" with ADSL2/2+ DSLAMs.
Telstra	Says it is "actively pursuing" the deployment of ADSL2 and ADSL2+ in its network, but won't give specifics. A small portion of Telstra's network is already capable.
TSN	Has installed its own DSLAMs in three Telstra exchanges and plans to turn on ADSL2+ with full 26Mbit/s speed as soon as it's approved.

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4.0 ADSL	1300 784 472	www.4dot0.net	$13.95* 250MB 256Kbit/s	$62.95 No limit 512Kbit/s
aaNet	1300 880 692	www.aanet.com.au	$25* 512MB 256Kbit/s	$34* 1GB 512Kbit/s
AAPT smartchat	13 88 88	www.aapt.com.au	$29.95‡ 200MB 256Kbit/s	$59.95‡ 12GB 512Kbit/s
Alphalink	1300 360 638	http://home.alphalink.com.au	$29.70* 200MB 256Kbit/s	N/A
Australia Internet Solutions	1300 887 877	www.ains.net.au	$24.95* 200MB 256Kbit/s	$59.95* 5GB 512Kbit/s
Australis Internet	1800 288 871	www.australis.net	$29.95* 200MB 256Kbit/s	$49.95* 3GB 512Kbit/s
Big Blue	1300 791 789	www.bigblue.net.au	$24.95* 500MB^ 256Kbit/s	$49.95* 4GB 512Kbit/s
Big Button	1300 721 726	www.bigbutton.com.au	$29.95* 200MB 256Kbit/s	$59.95* 1GB 512Kbit/s
BIT.net	1300 246 638	www.bit.net.au	$29.95* 500MB 256Kbit/s	$44.95 8GB 512Kbit/s
Bizmail Broadband	1300 797 774	www.bizmail.com.au	$29* 250MB 256Kbit/s	$49* 6GB 512Kbit/s
Blue Net Home	1300 852 147	www.blue.net.au	$29.95* 200MB 256Kbit/s	N/A
BB ADSL	1300 730 720	www.brownbear.com.au	$29.95* 200MB 256Kbit/s	N/A
Bullet Internet	1300 137 454	www.bullet.net.au	$27.95* 200MB+ 256Kbit/s	$49.95* 3GB+ 512Kbit/s
CENternet Broadband	1800 222 256	www.centernet.com.au	$29.95* 200MB 256Kbit/s	N/A
Chariot setconnect	1300 137 425	www.chariot.net.au	$29.95* 500MB 256Kbit/s	$59.95* 12GB 512Kbit/s
Comcen Internet	1300 300 324	www.comcen.com.au	$22.95* 200MB+ 256Kbit/s	$49.95* 4GB+ 512Kbit/s
Curl Internet	1300 135 908	http://curl.com.au	N/A	$49.95 25GB 512Kbit/s
CyberOne ADSL	1300 720 062	www.cyberone.com.au	$15.95* 200MB 256Kbit/s	$59.95 No limit 512Kbit/s
DART Residential	1300 305 113	www.dart.net.au	$26.95* 200MB 256Kbit/s	$55 4GB 512Kbit/s
DCSI	1300 665 575	www.dcsi.net.au	$29.95* 200MB 256Kbit/s	N/A
Dinkum Internet	1300 663 400	www.dinkum.net.au	$29.95* 200MB 256Kbit/s	N/A
Dodo	13 16 02	www.dodo.com.au	$24.90* 250MB^ 256Kbit/s	$49.90* 3GB^ 512Kbit/s
E-Access	1300 138 810	www.e-access.com.au	N/A	$59.95* 12GB 512Kbit/s
E-SOUL	1300 367 258	www.e-soul.net	N/A	$59.95 No limit 512Kbit/s
E.Tel Communications	1800 733 888	www.e-tel.com.au	N/A	$54.95* 5GB^ 512Kbit/s
Empcom ADSL Service	1300 731 368	www.empcom.net	N/A	$39* 1GB 512Kbit/s
Encomm Home ADSL	1300 738 455	www.encomm.com.au	$29.95* 200MB 256Kbit/s	N/A
FunnelWeb Internet	1300 723 161	www.fwi.net.au	$29.95* 200MB 256Kbit/s	N/A
Gday.net	1300 722 231	www.gday.net	$29.95* 200MB 256Kbit/s	$64.95* 1.5GB 512Kbit/s
Global Dial	1300 130 710	www.globaldial.com	N/A	$59.95 4GB+ 512Kbit/s
GOtalk	1800 468 255	www.gotalk.com.au	$19.95‡* 200MB 256Kbit/s	N/A
HotKey Internet	1300 655 366	www.hotkey.net.au	$24.95* 200MB 256Kbit/s	$39.95* 1GB 512Kbit/s
Hypermax DSL	1800 625 297	www.hypermax.net.au	$19.95* 200MB 256Kbit/s	N/A
IDONet	1800 617 292	http://ido.com.au	$29.95* 200MB 256Kbit/s	$59.50* 8GB 512Kbit/s
iiNet Bilink Broadband	13 19 17	www.iinet.net.au	$24.95‡* 200MB 256Kbit/s	$59.95 12GB+ 512Kbit/s
Independent Service Providers	1300 304 288	www.isp.net.au	$29.95* 300MB 256Kbit/s	N/A
Inspired Networking	1300 301 222	www.inspired.net.au	N/A	$59.95‡ No limit 512Kbit/s
Instant Communications	1300 138 369	www.in.com.au	N/A	$59.95 No limit 512Kbit/s
Internode Home ADSL	1300 788 233	http://adsl.internode.on.net	$29.95 500MB 256Kbit/s	$59.95 16GB 512Kbit/s
Interwerks	1300 720 207	www.interwerks.net.au	$29.95* 200MB 256Kbit/s	N/A
IPrimus Standard	1300 854 848	www.iprimus.com.au	$19.95* 200MB 256Kbit/s	$49.95 2GB 512Kbit/s
IPrimus 2000K+	1300 854 848	www.iprimus.com.au	$29.95* 400MB 2.048Mbit/s	$49.95 12GB 2.048Mbit/s
KeyPoint	1300 550 550	www.keypoint.com.au	N/A	$59.95* 4GB 512Kbit/s
Lime Net	1300 721 225	http://limenet.com.au	N/A	$54.95 1GB 512Kbit/s
Nella Telecommunications	1300 884 638	www.nella.net.au	$28.50* 300MB 256Kbit/s	$44* 4GB 512Kbit/s
Netbay Xtreme DSL	1300 733 215	www.netbay.com.au	$24.95* 200MB 256Kbit/s	$49.95* 4GB 512Kbit/s
Netspace Home ADSL	1300 360 025	www.netspace.net.au	$39.95* 300MB 256Kbit/s	$49.95 5GB+ 512Kbit/s
Optraweb	1300 730 720	www.optraweb.com.au	$29* 200MB+ 256Kbit/s	$41* 1GB 512Kbit/s
Optraweb	1300 730 720	www.optraweb.com.au	$29.95* 200MB 256Kbit/s	N/A
OptusNet Cable	1800 504 504	http://broadbandsales.optusnet.com.au	$29.95‡ 200MB 10Mbit/s	$49.95‡ 1GB 10Mbit/s
OptusNet DSL	1800 504 504	http://broadbandsales.optusnet.com.au	$29.95‡ 200MB 256Kbit/s	$49.95‡ 1GB 512Kbit/s
OzAdsl (Net Unlimited)	1300 886 998	www.ozadsl.com.au	$29.95* 200MB 256Kbit/s	N/A
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REEDS.NET Internet Services	1300 738 801	www.reeds.net.au	N/A	$56.40* 6GB 512Kbit/s
Schaelec	1300 554 687	www.Schaelec.com.au	N/A	$49.95 25GB 512Kbit/s
Spin Internet	1300 303 375	www.spin.net.au	$22.95* 200MB+ 256Kbit/s	$49.95* 4GB+ 512Kbit/s
SuperDSL	1300 888 090	www.supernerd.com.au	$24.95* 200MB 256Kbit/s	$44.95* 4GB 512Kbit/s
SwiftBroadband Residential	1300 360 187	www.swiftbroadband.com.au	$28.95* 200MB+ 256Kbit/s	$40* 1GB 512Kbit/s
TeeGee Internet	1300 731 132	www.teegee.com.au	N/A	$49.95 25GB 512Kbit/s
Tel.Pacific	1300 369 888	www.telpacific.com.au	N/A	$59.95 14GB+ 512Kbit/s
BigPond Cable	13 12 82	www.bigpond.com	$29.95* 200MB^ 10Mbit/s	$59.95 10GB^ 10Mbit/s
BigPond ADSL	13 12 82	www.bigpond.com	$29.95* 200MB^ 256Kbit/s	N/A
TPG Internet	1300 360 855	www.tpg.com.au	$24.95* 200MB 1.5Mbit/s	$49.95 25GB 1.5Mbit/s
Tropical North Internet ADSL	1300 854 624	www.tnpcanorth.com.au	$29.95* 300MB^ 256Kbit/s	N/A
TSN Internet	1300 760 360	www.tsn.cc	$29.95 1GB 10Mbit/s	$29.95 1GB 10Mbit/s
Big Gig ADSL Plans	1300 557 300	www.velocitynet.com.au	$29.95* 300MB 256Kbit/s	$49.50* 4GB 512Kbit/s
Veritel Australia	1300 669 869	www.veritel.com.au	$27.95* 200MB 256Kbit/s	$64.95* 1.5GB 512Kbit/s
Web Ace	1800 202 012	www.webace.com.au	$28.95* 300MB 256Kbit/s	$63.95 3GB+ 512Kbit/s
WestNet	13 19 60	www.westnet.com.au	$29.95* 300MB 256Kbit/s	$49.95 2GB+ 512Kbit/s
Yak Networks	1300 784 866	www.yak.com.au	$29.95* 350MB 256Kbit/s	N/A
ZCTS OzWide ADSL	1300 792 226	www.zcts.net	N/A	$59.95‡ No limit 512Kbit/s

*Key: * ISP charges excess usage fees when you exceed your download limit; † This price only available if bundled with long distance telephony from the ISP; ‡ Additional download allowance available with this plan for use in off-peak periods; ^ ISP combines sent and received data when calculating usage.*

Family plan (under $90, minimum 5GB data limit, at least 512Kbit/s)	High-speed plan (under $160, minimum 4GB data limit, at least 1.5Mbit/s)	National	Emails	Spam filtering	Setup fee	Rapid transfer
$62.95 No limit 512Kbit/s	$109.95 No limit 1.5Mbit/s	✘	100	✔	$121 3 mths	✔
$50* 25GB 512Kbit/s	$60* 4GB 1.5Mbit/s	✘	15	✔	$88 6 mths	✔
$59.95† 12GB 512Kbit/s	$89.95† 12GB 1.5Mbit/s	✔	6	✔	$149 1 mth	✘
$89 30GB 512Kbit/s	$99.90 10GB 1.5Mbit/s	✔	5	✔	$121 1 mth	✔
$84.95 No limit 512Kbit/s	$139.95* 5GB 1.5Mbit/s	✘	5	✔	$125 6 mths	✔
$59.95 25GB 512Kbit/s	$129.95 35GB 1.5Mbit/s	✘	25	✔	$149 6 mths	✔
$69.95* 20GB 512Kbit/s	$79.95* 5GB 1.5Mbit/s	✔	5	✘	$159.95 6 mths	✔
$89.95 30GB 512Kbit/s	N/A	✔	8	$5/month	$49 12 mths	✔
$59.95 15GB 512Kbit/s	$79.95 8GB 1.5Mbit/s	✔	5	✔	$125 6 mths	✔
$69 No limit 512Kbit/s	$89* 16GB 1.5Mbit/s	✘	10	✔	$129 6 mths	✔
$74.95 15GB 512Kbit/s	$128.95 25GB 1.5Mbit/s	✔	10	✔	$149 6 mths	✔
$87 50GB 512Kbit/s	$125* 25GB 1.5Mbit/s	✔	100	✔	$129 6 mths	✔
$69.95* 12GB+ 512Kbit/s	$99.95 15GB+ 1.5Mbit/s	✘	5	✔	$150 6 mths	✔
$89.95 No limit 512Kbit/s	$119.95 No limit 1.5Mbit/s	✔	5	✘	$149 1 mth	✔
$79.95 20GB 512Kbit/s	$85.95* 12GB 1.5Mbit/s	✘	5	✔	$110 6 mths	✔
$79.99 No limit 512Kbit/s	$89.95* 5GB+ 1.5Mbit/s	✔	5	✔	$99 6 mths	✔
$49.95 25GB 512Kbit/s	$99.95 35GB 1.5Mbit/s	✔	5	✔	$50 1 mth	✔
$59.95 No limit 512Kbit/s	$95.95 No limit 1.5Mbit/s	✔	30	✔	$139 6 mths	✔
$90 24GB 512Kbit/s	$99 4GB 1.5Mbit/s	✔	5	✘	$143 1 mth	✔
$79.95 30GB 512Kbit/s	$129.95 25GB 1.5Mbit/s	✔	6	✔	$125 6 mths	✔
$79.95 No limit 512Kbit/s	$119.95 No limit 1.5Mbit/s	✔	5	✘	$129 6 mths	✔
$74.90 No limit 512Kbit/s	$99.90* 15GB^ 1.5Mbit/s	✔	30	✘	$129 1 mth	✔
$79.95 12GB 512Kbit/s	$109.95* 6GB 1.5Mbit/s	✔	5	✘	$139 6 mths	✔
$59.95 No limit 512Kbit/s	$99.95 No limit 1.5Mbit/s	✔	5	✔	$129 6 mths	✔
$76.95 No limit 512Kbit/s	$89.95* 10GB^ 1.5Mbit/s	✔	10	✔	$148 6 mths	✔
$75 No limit 512Kbit/s	$145 No limit 1.5Mbit/s	✔	5	✔	$109 6 mths	✔
$65.95 10GB 512Kbit/s	$89.95 10GB 1.5Mbit/s	✔	1	✘	$129 3 mths	✔
$89.95 30GB 512Kbit/s	$129.95 25GB 1.5Mbit/s	✔	1	✔	$149.95 6 mths	✔
$89.95 No limit 512Kbit/s	N/A	✔	5	✘	$159 6 mths	✘
$79.95 16GB+ 512Kbit/s	$89.95 5GB+ 1.5Mbit/s	✔	10	✔	$99 6 mths	✔
$89.95† No limit 512Kbit/s	$129.95†* 15GB 1.5Mbit/s	✔	5	✘	$149 6 mths	✘
$69.95 10GB 512Kbit/s	$79.95* 5GB 1.5Mbit/s	✔	5	✘	$99 1 mth	✔
$79.95 No limit 512Kbit/s	$129.95 No limit 1.5Mbit/s	✔	5	✔	$149.95 1 mth	✔
$79.50 No limit 512Kbit/s	$110* 20GB 1.5Mbit/s	✘	5	✔	$110 6 mths	✔
$79.95 No limit 512Kbit/s	$89.95 12GB+ 1.5Mbit/s	✔	5	✔	$99 6 mths	✔
$88 No limit 512Kbit/s	$145 No limit 1.5Mbit/s	✔	3	✔	$120 1 mth	✔
$59.95† No limit 512Kbit/s	$89.95† No limit 1.5Mbit/s	✘	10	✔	$132 12 mths	✔
$59.95 No limit 512Kbit/s	$109.95 30GB+ 1.5Mbit/s	✔	5	✔	$135 6 mths	✔
$79.95 32GB 512Kbit/s	$89.95 12GB 1.5Mbit/s	✔	5	✔	$129 6 mths	4
$84.95 25GB 512Kbit/s	$119.95 35GB 1.5Mbit/s	✔	5	✔	$140 3 mths	4
$69.95 12GB 512Kbit/s	$119.95 12GB 1.5Mbit/s	✔	5	$4/month	$99 12 mths	8
$49.95 12GB 2.048Mbit/s	$49.95 12GB 2.048Mbit/s	✘	5	$4/month	$99 12 mths	8
$89.95 No limit 512Kbit/s	$99.95* 10GB 1.5Mbit/s	✘	5	✔	$98 6 mths	4
$74.95 40GB 512Kbit/s	$84.95 10GB 1.5Mbit/s	✔	10	✔	$129 6 mths	4
$69.90 24GB 512Kbit/s	$77* 4GB 1.5Mbit/s	✔	5	✔	$129 6 mths	4
$79.95 No limit 512Kbit/s	$99.95* 15GB 1.5Mbit/s	✔	5	✔	$120 6 mths	4
$69.95 20GB+ 512Kbit/s	$79.95 5GB+ 1.5Mbit/s	✔	10	✔	$109 6 mths	4
$69* 24GB+ 512Kbit/s	$89* 12GB+ 1.5Mbit/s	✘	100	$1/month	$135 6 mths	4
$89 50GB 512Kbit/s	$129 25GB 1.5Mbit/s	✔	100	✔	$135 6 mths	4
$64.95† 12GB 10Mbit/s	$64.95† 12GB 10Mbit/s	✘	5	✔	$99 12 mths	8
$69.95† 12GB 512Kbit/s	$98.95† 12GB 1.5Mbit/s	✘	5	✔	$59 12 mths	8
$79.95 10GB 512Kbit/s	$120 10GB 1.5Mbit/s	✔	5	$2.50/month	$120 12 mths	4
$64.95 12GB 512Kbit/s	$99.95 12GB 1.5Mbit/s	✔	15	✘	$0 6 mths	8
$54.95 No limit 512Kbit/s	$149* 22GB 1.5Mbit/s	✔	5	✔	$99 6 mths	4
$88.95 10GB 512Kbit/s	$149* 22GB 1.5Mbit/s	✔	5	✔	$99 12 mths	4
$69.95 12GB 512Kbit/s	$119.95 12GB 1.5Mbit/s	✔	7	✘	$149 3 mths	8
$49.95 12GB 2.048Mbit/s	$49.95 12GB 2.048Mbit/s	✘	7	✘	$149 3 mths	8
$54.95 25GB 512Kbit/s	$89.95* 10GB 1.5Mbit/s	✔	5	✔	$129 1 mth	4
$74.25 No limit 512Kbit/s	$103.10* 24GB 1.5Mbit/s	✘	5	✔	$125 6 mths	4
$49.95 25GB 512Kbit/s	$119.95 35GB 1.5Mbit/s	✔	5	✔	$120 6 mths	4
$79.99 No limit 512Kbit/s	$89.95* 5GB+ 1.5Mbit/s	✔	5	✔	$99 6 mths	4
$74.95 No limit 512Kbit/s	$99.95* 15GB 1.5Mbit/s	✘	5	✔	$100 6 mths	4
$68.95* 24GB+ 512Kbit/s	$78.95* 4GB+ 1.5Mbit/s	✘	10	✘	$126 6 mths	4
$89.95 35GB 1.5Mbit/s	$89.95 35GB 1.5Mbit/s	✔	10	✔	$89 6 mths	4
$79.95 No limit 512Kbit/s	$89.95 14GB+ 1.5Mbit/s	✘	5	✔	$129 6 mths	4
$59.95 10GB^ 10Mbit/s	$59.95 10GB^ 10Mbit/s	✘	1	$2.50/month	$189 3 mths	8
$79.95 10GB^ 512Kbit/s	$109.95 10GB^ 1.5Mbit/s	✔	1	$2.50/month	$99 12 mths	4
$79.95 No limit 512Kbit/s	$49.95 20GB 1.5Mbit/s	✘	20	✔	$129 6 mths	4
$79.95 32GB^ 512Kbit/s	$119.95 32GB^ 1.5Mbit/s	✔	5	✔	$79 6 mths	4
$79.95 No limit 512Kbit/s	$39.95 5GB 10Mbit/s	✔	100	✔	$129 6 mths	4
$79.50* 50GB 512Kbit/s	$79.50* 4GB 1.5Mbit/s	✔	10	✔	$69 6 mths	4
$89.95 No limit 512Kbit/s	N/A	✔	5	✔	$125 12 mths	4
$72.95 No limit 512Kbit/s	$117.95 6GB+ 1.5Mbit/s	✔	20	✔	$99 6 mths	4
$79.95 30GB+ 512Kbit/s	$89.95 14GB+ 1.5Mbit/s	✘	6	$0.83/month	$35 1 mth	4
$69.95 15GB 512Kbit/s	$149.95 20GB 1.5Mbit/s	✘	5	✔	$119 1 mth	4
$59.95† No limit 512Kbit/s	$139.95† No limit 1.5Mbit/s	✔	999	✔	$135 6 mths	✔

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- **PLE Computers** Tel: 08 9309 4771 www.ple.com.au

TAS:
- **Tasmanian Principle Computers** Tel: 03 6234 5677 www.tasmanianpc.com.au

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Learn to love Big Brother

Having trouble networking? *Iain Waugh* shows you how to set up a monitoring program that provides a summary of what's gone wrong.

Running a network is no easy task. Users eat up disk space or CPU time, software will crash, and machines aren't always reliable.

Quest Software's Big Brother was created to make it easier to monitor a network. Once it's set it up, a colour-coded summary page shows the status of all your machines at a glance.

PLANNING AHEAD

It's good to plan carefully before you start installing servers and clients.

A Big Brother machine can be set up in a number of ways:

- As the machine which generates the Web page reports. This machine is internally known as BBDISPLAY.
- As a machine which tests the network connectivity. This machine is internally known as BBNET.
- As a machine that notifies you when a critical alert has been raised. This machine is internally known as BBPAGER.
- As a client machine.

Generally speaking, a network monitored by Big Brother will only have one BBDISPLAY and BBPAGER host, but more can be added.

Data from the clients is stored on the BBDISPLAY, BBNET and BBPAGER machine(s) in the "bbvars" directory. The BBDISPLAY and BBPAGER server daemons check the data and act on what has been stored in it.

WINDOWS INSTALLATION

You need to be logged in as an administrator to install the software on a Windows machine.

To install the server, download and run the server file: BBNTD2-30.EXE. Once it's installed, you will need to edit the bb-hosts file as shown in "The bb-hosts Configuration File" section on the next page.

You should look at the other files in the <install path>\Big Brother BTF\BBNTD\2.30\etc\ directory. You don't need to change anything, but it's worth familiarising yourself with what each one can do.

INSTALLING THE CLIENT

Firstly, download and run the client file BBNT1-08D.EXE. This will install the files for the client service. The installer does not create a shortcut to the configuration utility, but you can find it under <install path>\Big Brother BTF\BBNT\1.08d\bin\bbntcfg.exe and create one yourself.

When you run the configuration utility, explore the configuration settings. As you select items from the drop-down boxes, the required configuration setting automatically appears.

The client's GUI doesn't show you all of the parameters you can tweak, but you can find them stored in the registry under: HKEY_LOCAL_MACHINE\SOFTWARE\Quest Software\BigBrother\bbnt.

SERVE IT UP, THEN FIX IT UP

The final step in getting your Web pages generated for Apache users is to set up an alias to point to the location of the Web files.

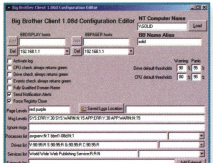
To do so, add the following lines to your httpd.conf or commonapache2.conf files:

```
Alias /bb/ /home/bb/bb1.9e-btf/www/

<Directory /home/bb/bb1.9e-btf/
www/>
Order allow,deny
Allow from all
</Directory>
```

IIS users should find that the installation script has set up IIS sharing permissions, but check them by right-clicking on the www and cgi-bin directories, selecting Properties > Web Sharing. The www directory should have Read, Directory Browsing and Scripts selected. The cgi-bin directory should have Execute and Directory Browsing selected.

Then point your browser to the BBDISPLAY host's /bb/ URL where you'll see the home page with your system's first alerts. You'll



Easy interface: *playing with the settings gives you a good idea of what is possible.*

Also in Workshop

102 Windows XP Utilising prefetch
There isn't much information available on Windows XP's prefetch process. *Bert Smith* fills in the gaps.

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Software Update Service is a great way to streamline update distribution across home networks. *James Bannan* shows you how.

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Anthony Caruana explains how to convert a PDA into a multimedia remote control.

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Daniel Winter creates DVDs with nothing but freeware applications.

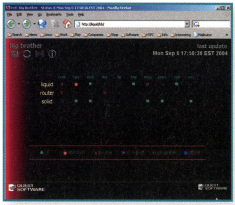
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All code fragments and examples given in Workshop articles are for demonstration purposes only. Questions or comments? Email workshop@apcmag.com.



***Red alert:** a healthy start — now fix up those naughty dots.*

be lucky to get a green light across the board at first because the systems will probably exceed some of the default alert levels.

Starting off with alarms and errors is good. It lets you know that the system is doing its job, and you'll quickly learn what to do about an alert when it goes off. Simply put, click on the coloured icon, read the failure report and proceed from there. Detailed help is available by clicking on the "i" symbol at the top left-hand corner of the Web page.

If you want to see the results, wait 5-10 minutes for the Web pages to be updated or restart the client, then the server. The Web pages aren't always automatically updated after a restart if the BBNET had to run network tests. Look at the timestamps of the Web files in the bb1.9e-btf / www/ directory to see if an update has occurred.

On the cover DVD

Bonus DVD software

Big Brother (Windows Server v2.30, Windows Client v.1.08d and Linux server/client source v.1.9e). Files can be found under "From the Mag".

Skill level

Intermediate (networking experience needed).

Requirements

Web server (Apache, IIS, and so on) • SMTP server (for notifications).

Time to complete

1 hour per server, 10-30 minutes per client.

Inside info

- Big Brother
  A freely downloadable version
  www.bb4.org
- An impressive demo
  http://demo.bb4.com/bb
- Scripts, tools, extensions and documentation
  www.deadcat.net.au
- Online help page
  http://demo.bb4.com/bb/bbnc-help
- Archived support mailing list
  http://support.bb4.com

LINUX INSTALLATION

For security reasons, Big Brother has been written to run as an ordinary user. Before downloading, create a user called "bb". This is the account that Big Brother will use.

```
# useradd bb -m -G users -s /bin/bash
# passwd bb
```

Now download the bb-1.9e.tar.gz into /home/bb/ and expand it to reveal the server and client archive files.

```
# tar -xvpzf bb-1.9e.tar.gz
```

INSTALLING THE SERVER

As root, change to bb's directory, extract the server archive and configure it:

```
# cd ~bb
# tar -xvpf BBSVR-bb1.9e-btf.tar
# cd bb1.9e-btf/install
# ./ bbconfig
```

The configuration just involves agreeing to the end-user licence, then answering a set of questions. The setup script does a good job of guessing what you'd like. The sequence goes:

1 Confirm OS: this should be auto-detected to something like "debian", "redhat". Look in the Install directory for a list of values (bbsys.*) to use if the configuration goes awry.
2 Choose the user: "bb" for this example.
3 Use FQDN: Fully Qualified Domain Names (you can say no here if every machine is local).
4 Which host for BBDISPLAY? Name of the machine the Web pages will be served from.
5 Which host for BBPAGER? Name of the machine where notifications come from.
6 Is this machine the BBDISPLAY host? Yes, if this machine will create the Web pages.
7 Is this machine the BBPAGER host? Yes, if this machine will send you notifications.
8 The base URL for BB: this has a similar function to public_html — the default value should be fine.
9 The CGI directory: point this to where the cgi-bin is located.
10 The CGI base directory: the default value is suitable.
11 The Web server user ID: should be the same as the user setting in your apache configuration, probably "apache" or "nobody".
12 The Web server group ID: this should be the same as the group setting in your apache configuration, probably "apache" or "nobody".

CONFIGURATION

Once you've answered these questions, the script tells you what to do next.

Execute the five commands it shows to make and install the binary files, then edit the ../bb-hosts file, shown in bb-hosts Configuration File. Take a look at the BBDEF.SH file and tweak any settings you want.

Now go into the BBDEF-SERVER.SH file. You can set some values in the NONETPAGE variable now if you like, or wait until you get annoyed with your paging service and do it then.

Big Brother comes with configuration checking tools which can be found in the etc/ directory of the server and client directories. They are bbchkcfg.sh, bbchkcmds.sh and bbchkhosts.sh. Run each tool to check the configuration files are okay. To run the server, type in the following as "bb":

```
# cd ~/ bb1.9e-btf
# ./runbb.sh start
```

This starts the Big Brother daemon. You can stop it or restart it with the following:

```
# ./runbb.sh stop
# ./runbb.sh restart
```

INSTALLING THE CLIENT

From the home directory of "bb", expand the archive and create a symbolic link to it:

```
# tar -xvpf BBCLT-bbc1.9e-btf.tar
# ln -s bbc1.9e-btf bbc
# cd bbc/install
# ./ bbconfig
```

The configuration involves agreeing to the end-user licence, then answering the first four questions from the server installation.

The script will tell you what to do next. Execute the four commands it shows you to make and install the binary files, then edit the ../bb-hosts file on the BBDISPLAY, BBPAGER and BBNET machine(s) to point to the client you've just set up.

Copy the bb-hosts file you just edited into the client's etc directory, then start the client daemon the same way you started the server's daemon. Run the configuration checking scripts (as for the server) and fix any errors, then type the following as "bb":

```
# cd ~/ bbc
# ./runbb.sh start
```

PC PHONE HOME

To respond quickly to a system outage you need to be notified of failures as they occur, but not about inconsequential events.

Thankfully, Big Brother supports a very flexible notification system. You can configure it to notify you by email, numeric pager, SMS or a custom method. However, email is the most common method.

To use email notification, pick a host with an email program and set up a BBPAGER host in the bb-hosts file. The notification triggers are controlled by the etc/bbwarnsetup.cfg and etc/bbwarnrules.cfg files on the BBPAGER host.

The comments in the files should be enough to give you a start, but BBWARNSETUP.CFG has many variables which are specific to SMS and numeric paging. You'll need to restart the server for changes to take effect. The variables relating to email notification are:

bbwarn: TRUE: this must be set TRUE for paging to work.

pagedelay: 15: the number of minutes between pages (set it really high to be paged only once).

pagetype: EVENT: this is one of four possible modes and will suit most cases.

pagemaster: root@localhost: a list of email addresses to be notified.

The notifications are filtered in etc/bbwarnrules.cfg. The format of the filters is:

```
hosts;exhosts;services;exservices;day;time;recipients
```

day is 0 to 6 for Sunday to Saturday, and time is 0000 to 2359.

An asterisk (*) can be used on the hosts and/or services field to select them all, while !* deselects all. The simplest filter line which mails every alert to root@localhost is:

```
*;;*;;*;*;root@localhost
```

However, it's also the most annoying. To prevent everyone from being notified on the weekend and between 8pm and 7am, enter:

```
!*;;*;;0 6;0000-0700 2000-2359;*
```

You can set an initial delay for each recipient by specifying recipient:~XX[-YY], where XX is the initial delay and YY is the delay between subsequent notifications.

The following line prevents bob from being notified about events on smallbox more than once an hour on an alert that has been active for 15 minutes:

```
smallbox;;*;;*;*;bob@bigbox:~15-60
```

Lastly, you can disable the warnings by using:

```
!*;;*;;*;*;*
```

SO MUCH MORE...

Big Brother is capable of more than can be covered here. Look at the deadcat FTP site (**www.deadcat.net.au**) and see if any extensions take your fancy. You can monitor anything you like if you're willing to delve into the documentation.

THE BB-HOSTS CONFIGURATION FILE

This is the most important configuration file in the distribution. You need to add a line in the bb-hosts file for every computer you want to monitor. The format of each line is:

```
<IP Address> <host name> # <a list of big brother directives>
```

If the machine is assigned its IP address by DHCP, use 0.0.0.0 for the IP address. The host name is host.domain.com if you answered "y" to the FQDN question during the installation. Otherwise, it's just host.

DIRECTIVES

BBDISPLAY: is the machine with the Web server to display results.

BBPAGER: is the machine which acts as the pager server.

BBNET: is the machine that checks the IP network services.

http://<path> tests the HTTP connections for this server and path.

https://<path> tests the HTTPS connections for this server and path (requires lynx).

ftp, smtp, pop3, telnet, ssh, nntp, dns, imap tests the machine for the specified server. If you prefix it with a !, check that the service isn't running.

noping don't do ping test for this host.

dialup if host is down then display clear button and don't send page notifications. This is also useful for machines which are regularly switched off.

The http and https directives can check multiple URLs by separating them with a | or a space. For example, bb-hosts file:

```
192.168.1.100 bigbox # BBDISPLAY BBPAGER http://www.thishost.com/ !ftp pop3 imap ssh
192.168.1.200 smallbox # BBNET ftp smtp
192.168.1.254 router # dns
```

In this example, bigbox is the computer running Apache, so it will be the BBDISPLAY machine. It's also running SMTP, so it is used as the BBPAGER machine to send notifications. smallbox is used to test IP network services with the BBNET directive. It checks that router is running dns, smallbox is running ftp and smtp services and bigbox is running http, pop3, imap and ssh but not FTP.

The bb-hosts file also lets you control the display format of the Web pages using embedded commands:

page <filename> <title> Every host listed after this will appear on a separate Web page under the main "bb.html" page. Note that the filename does not include the ".html" suffix.

subpage <filename> <title> this directive can only appear after a page directive. Every host listed after this directive will appear on a separate Web page beneath the page directive that preceded it. Again, the filename doesn't include the .html suffix.

group <name> every host listed after this directive will appear in a separate grid of coloured dots.

group-compress <name> identical to group except it only shows columns which have data.

summary <local page> <remote IP address> <URL> send a summary of <local page> to another BBDISPLAY host. <local page> can be bb.html, bb2.html or a page or subpage filename. The summary appears at the bottom of the bb.html page on the remote machine. LTR

Problematic prefetch

There isn't much info on Windows XP's prefetch process in Microsoft's Help and Support Centre, or in the XP Resource Kit documentation. *Bert Smith* fills in the gaps.

Your C:\Windows\Prefetch folder probably contains many files occupying several MB of disk space, all (except LAYOUT.INI) with the .PF file extension. But what are the functions of these files? Do they degrade system performance? Should they be purged?

Skill level

Beginner

Requirements

XP Home or Professional.

Time to complete

30 minutes

Inside info

- Troubleshooting Windows XP by Kelly Theriot (Microsoft MVP) **www.kellys-korner-xp.com/xp_p.htm**
- Windows XP: Kernel Improvements Create a More Robust, Powerful, and Scalable OS **http://msdn.microsoft.com/msdnmag/issues/01/12/XPKernel/default.aspx**
- Windows XP Performance **www.microsoft.com/technet/prodtechnol/winxppro/evaluate/xpperf.mspx**

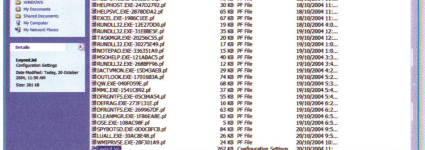
WHAT'S *.PF ALL ABOUT?

Windows XP monitors the files used in booting a computer and when it's starting applications. XP's prefetcher, part of its memory manager, copies portions of those files to the prefetch area of the hard drive.

Windows XP prefetches boot files, drivers and applications into cache to decrease the time needed to start the OS and run applications. Prefetching doesn't copy the files themselves — it creates an index to the location of the files on the hard disk, including the order in which they are loaded. Generally this works well, but there are exceptions.

When an application runs, the XP prefetcher creates a .PF file containing data about the application and its location on the disk. Every three days the prefetch process uses the .PF files to modify a table named LAYOUT.INI. This is used when defragging the drive to allow files to be placed in optimum positions, reducing their loading time.

The goal of prefetching is to speed up your computer. If prefetch files don't function correctly, or if there are many old files, things will slow down. A sluggish or poorly responding system can result from one or more corrupted or virus-infected prefetch files. After a malware scan, open %windir%\prefetch, delete any offending files and reboot. Otherwise, leave the maintenance of .PF files to XP.



Play fetch: *prefetching should speed up your computer; if it doesn't, clear out the cache.*

MODUS OPERANDI

Windows XP uses parallel driver loading — when drivers are placed together on the disk layout, boot time is reduced. There are three prefetch operating modes: Boot Only; Applications Only; or both Boot and Application. Boot prefetching isn't done until the third boot of the system, when sufficient information is available.

The OS also uses application prefetching. The files accessed by each new process and their contents are observed and recorded. No prefetching is done for the first launch of an application, so this is usually slower than subsequent ones. Between 85 and 90% of the improvement is gained after one launch, and the remaining speed improvement comes after the system has adjusted the disk layout with information specific to the application.

The Prefetch folder is self-maintaining. If not used, .PF files will be removed. Purging the Prefetch folder of its contents does no damage, but it may take several days to recapture .PF data, update LAYOUT.INI and then for the "idle" time defrag to redo a partial defrag of the drive. (You can use the command `defrag c: -b` to force XP to perform this optimisation without doing a full defrag.) There are no great advantages to purging the contents of Prefetch. If it contains references to malware, or if the files refer to applications that are rarely used or no longer there, then you should clear it out.

The function does have a small impact on performance. Disabling it, or only enabling it for the Boot files will allow you to free up system resources and preserve disk space. This should only be considered for systems with limited resources.

TWEAKING THE XP PREFETCHER SERVICE

After making a System Restore Point, go to Start/Run/Regedit and navigate to the HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\Memory Management\PrefetchParameters key. Create a new DWORD value, or modify the existing value, called `EnablePrefetcher` and set it according to these options: **0** = disabled; **1** = application launch prefetching; **2** = boot prefetching; or **3** = prefetch everything. For a 64 or 128MB workstation, set the value to 0. For 512MB or more set it to 3. Otherwise, experiment to find the value that best suits your PC. Don't forget to reboot!

Purging the prefetch cache deletes all the files in the Prefetch folder (C:\Windows\Prefetch). It's convenient to use a simple batch file to kill these files.

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Editor's Choice October 2004 apc

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The prime SUSpects

Software Update Service is a great way for businesses to streamline update distribution across their networks. *James Bannan* shows you how to implement it at home.

The Microsoft Software Update Service (SUS) is what you connect to when you go to the Windows Update Web site for the latest patches and security updates. It's a great service for home users, but it's not practical for businesses with hundreds of Windows-based machines to have them *all* connect remotely to the Microsoft site for updates. Apart from removing control of the network from the IT team, it's also a shocking waste of bandwidth.

Enter SUS. This is a great tool developed by Microsoft which allows a single local Windows server to connect back to the main update servers and pull down the latest patches. Internal clients then connect to the local SUS server for their OS updates. There's no wasted bandwidth and the IT team retains control over update distribution.

This is also an issue faced by power users who have more than one Windows machine at home. No-one wants to use up their bandwidth on unnecessary updating when it could all be done in one step, especially when downloads are capped. The problem is that SUS was designed to be installed only on Windows Server 2000 SP2 or 2003, which are too expensive for most people to run at home. However, with a little tweaking, you can configure SUS to install and run properly on Windows XP Professional.

On the cover DVD

apc

Bonus DVD software

TARGETSUS.REG • MSI2XML. Files can be found under "From the Mag".

Skill level

Advanced

Requirements

Windows XP Professional • Microsoft SUS Server SP1.

Time to complete

1 hour (approx)

WEB IT UP

The first step is to install Microsoft's Internet Information Services (IIS), which is a prerequisite of a SUS install as it forms the back end of the update service. When your clients connect to the SUS machine, they're connecting to an ASP Web application.

Before you get started, it's a good idea to disconnect the machine from the Internet as IIS will be running as soon as the installation is complete (before you can implement any kind of security) and you don't want to leave yourself exposed.

Insert the Windows XP Professional CD into the machine, cancel the autorun dialog box, and head to Control Panel > Add/Remove Programs > Add/Remove Windows Components. Tick Internet Information Services, then highlight it and click Details. Leave the following options selected: Common Files, Documentation, Internet Information Services Snap-In and World Wide Web Service. If any others are ticked, you can safely check them — they aren't needed.

Click OK twice to start the installation. Windows will grab the necessary files from the CD and the installation will complete. Go to Control Panel > Administrative Tools, and there should be a new icon: Internet Information Services. Make a short cut of that on the desktop, it will become useful later on.

THERE AND BACK AGAIN

The next step is to modify the SUS install file so that it will run on XP Professional. Create a folder called c:\SUS, go to **www.apcmag.com/info/SUS_link** and copy the SUS10SP1.EXE file there. Next, open a command window (Start > Run > cmd), navigate to c:\SUS and type in:

```
SUS10SP1.exe /T:c:\SUS /C
```

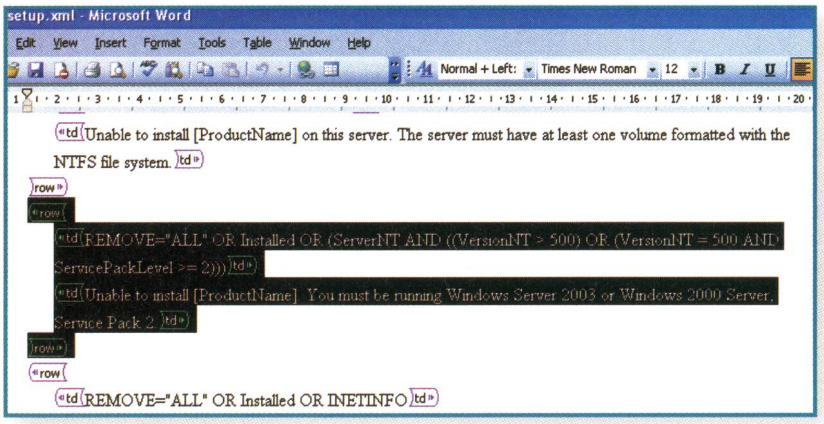
This will extract the installation file from the .EXE.

Next, install MSI2XML from this month's cover DVD. This is a shell extension which converts Microsoft MSI files into an editable XML format. Once installed, open another command window, navigate to c:\SUS and enter:

```
msi2xml sussetup.msi
```

and the conversion process will start. The result is a 65MB XML file, so the conversion will take a while. At this point, make a backup of the SUSSETUP.MSI file in another folder, and delete the copy in c:\SUS. Open the newly-created SUSSETUP.XML file in an editor — Notepad or Wordpad will do fine, but Word or Dreamweaver display the XML formatting more intuitively.

1 Search for the phrase "You must be running Windows Server" (not case-sensitive). This will



1 *Highlight and delete the You must be running Windows Server error condition, which checks on the OS being run.*

take you to the error condition in the installation which checks the operating system you are running. Highlight the entire condition, including the start and end ROW tags, and delete it. Save the file and exit. Open another command window and enter:

```
xml2msi sussetup.xml sussetup.msi
```

to recompile the MSI install file. Launch it to start the SUS installation.

2 The installation is straightforward — the only real configuration comes afterwards. Note that the install will apply the IIS Lockdown patch, which changes some of the core permissions on the SUSAdmin folder. This is relevant because as soon as the install is completed, it will try to launch **http://localhost/SUSAdmin**, and will probably come back with a Permission Denied page. This is normal as part of the IIS Lockdown tool prevents members of the Web Anonymous Users group from accessing the SUSAdmin folder.

To get around this while maintaining security, go into Internet Information Services and expand Web Sites and Default Web Site. Right-click on SUSAdmin and select Properties > Directory Security, click the Edit button at the top (authentication control). Uncheck Anonymous Access, and tick Integrated Windows Authentication at the bottom and click OK to save the changes. This change means that as a logged on user with the necessary rights (should be admin), you'll be authenticated to the SUSAdmin Web page. If you connect remotely to the SUS machine, you'll be prompted to enter the username and password of a valid user.

3 Launch the SUSAdmin Web page either through IE (**http://localhost/SUSAdmin**), or go to Administrative Tools > Microsoft Software Update Services > Set Options and change any options you may need to set in terms of proxy server access. Go to Synchronize Server and click Synchronize Now. SUS will access the Windows Update site and download the available catalogue of updates. A new installation of SUS is a large download which takes some time, as Service Packs are included.

Once this is done, go to Approve Updates and tick the updates you want to be made available to your clients. You can also go back and set a synchronisation schedule (daily is best), along with automatic approval for new updates, if you wish. SUS doesn't download updated Windows hardware drivers (there are simply too many of them) or application updates like .NET Framework or Media Player. You'll still have to get those manually.

PUSH 'EM OUT

Now it's time to get your clients talking to the new SUS server. Open the TARGETSUS.REG file on this month's cover DVD in Notepad. The SUS client software is embedded in Windows 2000 SP2 and XP SP1 (Professional and Home), so you only need the registry updates to point your client in the right direction. Change the `http://yoursusserver` lines to the network name of your SUS machine (this is the NetBIOS name, the one you use to ping it).

Save the file and apply the changes. Either restart the machine or go into Administrative Tools > Services and restart the Automatic Updates service.

The Background Intelligent Transfer Service should also start up, showing that the machine is connecting to the SUS server to acquire updates.

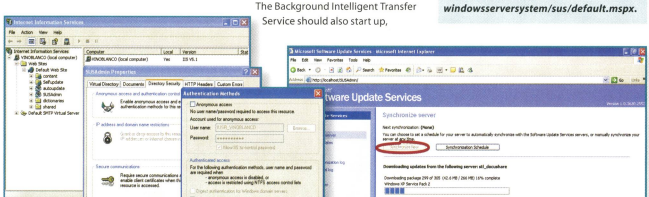
You can also apply this registry change to the SUS machine itself. It can update Windows from the SUS Web pages like any other client, as it connects to IIS just the same, regardless of where the update files are actually stored. This registry setting will check for updates each day, or when the client first starts up.

If you're not receiving any updates and you want to force a check, open Regedit and navigate to HKLM/Microsoft/Windows/Current Version/WindowsUpdate/Auto Update. Delete the `LastWaitTimeout` and `NextDetectionTime` keys, then either reboot or restart the update service. The client will connect with the SUS box again. If you want to see what the service is actually doing, open the c:\Windows\Windows Update.log file.

SUS chaining

SUS servers don't have to update from the main Microsoft servers, they can pull their updates from each other. In the Set Options area of SUSAdmin, you can specify another local SUS machine to be the update source. This is great if you're part of a shared wireless network — one person can download the updates and distribute them to other servers on home networks. It's also great for businesses with heavy update loads or physically distant networks as you still get the cost saving on reduced bandwidth.

SUS is going to be superseded in the near future by Windows Update Services (WUS), but it will still be free. Check it out at *www.microsoft.com/windowsserversystem/sus/default.mspx*.



2 *To get around the Lockdown patch, which prevents members of the Web Anonymous Users group from accessing SUSAdmin, check Integrated Windows Authentication.*

3 *Hit Synchronize Now and SUS will access the Windows Update site and download the available catalogue of updates.*

Take control!

***Anthony Caruana* demonstrates how to convert an old PDA into a remote control capable of handling TVs, VCRs and even a PC.**

Almost all PDAs come with an infra-red port. The port was designed for transferring contacts and files between devices but it can also, when paired with the right software, convert your handheld into a universal control for your TV, DVD player, stereo and even the latest media centre PCs.

LOOK PORT-SIDE

The first thing you need to know about your device is what flavour of IR port it has. Some ship with Standard IR (SIR), while others have the preferred option of Consumer IR (CIR). CIR has a range of around 10 metres, as long as there isn't any signal interference. SIR is limited to a couple of metres but don't despair if that's what you have, as you can add a more powerful transmitter with a booster that connects to the 3.5 mm headphone jack.

There are many different software solutions for both Pocket PC and Palm OS devices. However, all the applications work the same way. If you have an iPAQ Pocket PC it may already have the software, as several models ship with Nevo Remote pre-installed in ROM.

While configuring remote control software can be straightforward, look at the instruction manual first and see what information it provides. All devices are programmed with specific remote control codes and if you know the code for your device, setting up the software may just be a matter of entering that code into the software.

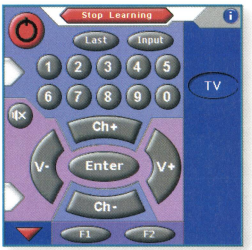
If you don't have the code, you can still avoid programming each button as most apps ship with a long list of preset configurations. Select the make and model of your appliance, tell the software, and it will all be ready. If there are several similar models available for selection, trial and error testing will quickly find the right setting.

MANUAL PROGRAMMING

If the software doesn't have a preconfigured setup for your appliance, you'll have to program each button manually. This can be time-consuming but, in the end, you'll have a personally designed interface for your home entertainment equipment.

The first step is to decide what you want to control from your PDA. A minimalist approach is best, as a PDA's screen offers limited real estate. If you have a TV, DVD player and VCR, you should be able to design a single screen that provides basic controls for all these devices.

For the TV, six buttons will suffice — power, channel up and down, volume up and down and



One size fits all: *don't throw away that old PDA — turn it into a remote control.*

AV source. For the other two appliances, power, a play/pause toggle, forward and rewind will deal with most tasks. This makes a total of 14 buttons, which should fit on to a single screen.

Using NoviiRemote for the Palm as an example (included on this month's cover DVD), you can create a control system for a typical lounge room. Add a new codebase called Living Room by pressing Setup, then the Start Learning button.

NoviiRemote generates a set of standard buttons. Tap the Power button and press the Power button on your remote control, aiming it at your Palm's IR port. Repeat this for each button. Tap the Stop Learning button when you're done.

Once you've finished programming buttons, test each one and make sure your appliance responds in the way you want. If any buttons don't work, you can retrain them by returning to Setup and using the ReLearn option.

COMPUTER CONTROL

As well as using a PDA to control entertainment devices, you can also use it with a PC. If you have a Palm device and a Mac with Bluetooth, you can use Salling Clicker (included on this month's cover DVD) to effectively turn the PDA into a mouse with some applications.

After installing Salling Clicker, pair your PDA and Mac. Launch Salling Clicker and follow the instructions to connect to your Palm and install the PDA side of the software. Run the application on your PDA, connect to the Mac, and you can control a number of the iLife applications, presentations, and even remotely view pictures from iPhoto.

Apart from the convenience of using your PDA as a remote control, this can be a great way to extend the life of an old PDA. And it can be fun wreaking mischief at friends' homes while they're watching TV... EOTB

On the cover DVD

Bonus DVD software

NoviiRemote for Palm and Pocket PC trial • Salling Clicker 2.2. Files can be found under "From the Mag".

Skill level

Beginner

Requirements

Palm or Pocket PC PDA with IR port (preferably Consumer IR) • IR booster hardware (optional).

Time to complete

1 hour (approx)

Inside info

Universal Remote Control Codes
www.xdiv.com/remotes

Infra-red Data Association (IrDA)
www.irda.org

Infra-red remote control technology
www.epanorama.net/links/irremote.html

View a different World



EDITING PRODUCTS



DVD MAKER USB DVD MAKER PCI

VIDEO MAGICIAN

DVBT USB2.0 **DVBT PCI**



PCMCIA ANALOG TV TUNER

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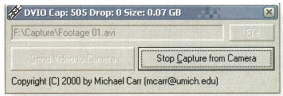
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61 3 9561 6166

Free DVD authoring, part 1

If upgrading to a DVD burner has left you strapped for cash, *Daniel Winter* shows you how to create DVD movies with nothing but freeware applications.



Straight to disk: *DVIO is a tiny application that can be used to record to and from DV cameras such as this Sony.*

A DVD burner definitely makes life easier. Being able to back up files larger than 700MB is worth the price of a DVD±R drive alone, for video as well as other data. The problem is that home-made video files won't necessarily play on a standard DVD player. Unless your player supports MPEG-4 formats such as XviD and DivX, DVD-Videos will require an additional authoring process before they can be used.

There are commercial DVD authoring packages available which transparently perform all the tasks required to make this transformation, but this two-part Workshop walks you through each step of the process, from capturing to burning, using nothing but open source and free software.

On the cover DVD

Bonus DVD software

DVCap • DVIO • WinDV • Zwei-Stein Video Editor • VirtualDub • BeSweet • BeSweet GUI • VirtualDub 1.5.10 • VirtualDub-MPEG2 • QuEnc • AviSynth • IfoEdit • DVD Decryptor • DVDAuthorGUI • XviD. Files can be found under "From the Mag".

Skill level

Intermediate

Requirements

DVIO• VirtualDub • BeSweet • QuEnc • AviSynth • digital video camera or other video capture device • PC FireWire port.

Time to complete

2 hours (approx)

In this series . . .

Part 1 — March 05
Creating DVDs with freeware

Part 2 — April 05
Creating chapters and names

CAPTURE AND EDIT

The first step is to get the video footage onto the computer. This process involves converting an analog or digital video source to AVI or MPEG files on your hard drive. This Workshop assumes you're using a digital video camera. Regardless of how you get the video onto the PC, once it's in AVI format it can be used for the rest of this Workshop. If you need to convert from another format, such as MPEG, use VirtualDub-MPEG2 (included on the cover DVD).

Working with digital video requires a FireWire cable to connect the camcorder to your PC via the FireWire port on your motherboard, capture card, sound card or separate FireWire card.

Most digital camcorders also support "digitising", meaning they can be used to convert an analog signal coming from a device such as a VCR. Simply plug the output of the VCR into the line-in socket of the camcorder, then ensure this feature is enabled. In Sony camcorders, it appears as AV > DV OUT in the camcorder's main menu.

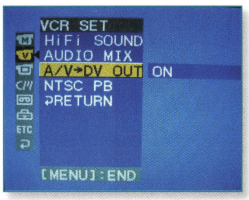
Many FireWire cards and some video cameras come with basic editing and capture software which can be used at this stage if preferred. Otherwise DVIO and WinDV are freeware capture utilities provided on this month's cover DVD.

DVIO is a straightforward application that streams whatever is being played on or through the camcorder straight to disk. WinDV is slightly more user-friendly, and provides a preview window so you can view whatever is captured in real time. In either case, a drive location must be selected for storing the captured video. Ensure the destination drive has at least 20GB free (this will store about one hour of digital footage).

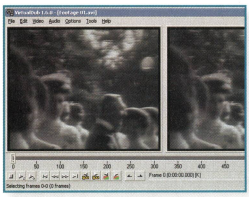
Once the video is captured on the hard drive, it can be edited with Zwei-Stein (on the cover DVD) or any other video editing software, such as Ulead Video Studio or Sony Vegas. Zwei-Stein is a full-featured, multitrack freeware video suite that supports titles as well as a large number of transitions and effects.

UNCROSS THE STREAMS

From Zwei-Stein you need to export a WAV file as well as an AVI file, as the visual and sound tracks need to be encoded separately using VirtualDub.



Quick conversion: *a DV camera can be used to capture from a VCR or other analog video source.*



Dub wiser: *visual and sound tracks need to be exported and encoded separately in VirtualDub.*

To install VirtualDub, extract the ZIP file on the cover DVD to a suitable location on your hard disk. From there, run the VIRTUALDUB.EXE file to launch the program.

In VirtualDub's main window, select File > Save WAV. Choose a location and file name and then hit Save. When that is complete, select Audio > No audio and video > Direct stream copy. Follow this by selecting File > Save as AVI. Specify a location and name for the output file and hit Save again. These are the master files that are encoded to the format required by the DVD.

SOUND OFF

There are two acceptable formats for DVD audio — MP2 and AC3 (AC3 supports 5.1-channel sound, but otherwise provides no great advantage when working with conventional stereo recordings). In either case, the BeSweet application can be used to convert WAV files to DVD-ready audio. Start by extracting the BeSweet and BeSweetGUI archives to the same location on your hard drive.

Run the BeSweet GUI V0.6.EXE file and select Wizard mode. When the BeSweet interface appears, drag the WAV file created in the previous step onto the file list and click Next. Select MP2 from the following step, followed by Stereo. Then select 224 as the bit rate and leave the FRC Preset at None. In the final step, click GO and BeSweet will appear in a DOS command window until the new MP2 or AC3 file is created. If you have any problems with BeSweet, try copying the full command line parameters from the floating window at the top of the screen into the Windows Run window, ensuring the BESWEET.EXE file is correctly referenced.

THE PICTURE TUBE

Encoding the video is a little more sophisticated, as it requires a frame relay server. One application (in this case AviSynth) is used to stream the video from the source AVI to the MPEG encoder application (QuEnc).

Install AviSynth from the cover DVD and extract the contents of the QuEnc ZIP file to a suitable location on your hard drive. AviSynth requires a script file, which is somewhat like a configuration file, comprised of just a few lines of text. Create this file by opening Notepad and entering:

```
AviSource("c:\capture\footage.avi")
BicubicResize(720,576,0,0.5)
AddBorders(0, 106, 0, 108)
ConvertToYV12()
```

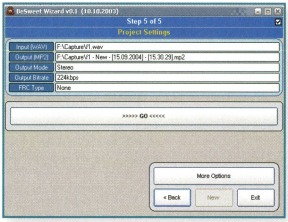
Edit the first line to reflect the path and name of the silent AVI file you're using as the DVD source video. Save this file with the extension .AVS, then launch the QuEnc executable. Load this AVS text file as the video source in QuEnc by clicking the browse button in the top right-hand corner. The destination file is automatically set, but you can nominate one. Check that MPEG-2, Use VBR and High Quality are selected. For extra quality, use the 2 Pass Encoding option, though this increases the rendering time for the MPEG-2 video. Next, click the Advanced Options button. In the window that pops up, enter one of the following values in the Auto Max Bitrate field, depending on the total duration of video included.

Duration	Bitrate (Kbit/s)
Less than 1 hour	9,500
1 hour	9,500
1 hour 15 minutes	7,900
1 hour 30 minutes	6,500
1 hour 45 minutes	5,500
2 hours	4,800

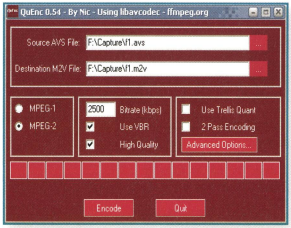
Among the other configuration options available is the Process Priority select box. This should be set to Low if you plan to continue using your computer during the encoding process, which could take minutes or hours, depending upon your CPU and the length of the video.

Close the Options window by clicking Apply and start the render by pressing the Encode button in the main QuEnc window. If you have any problems with QuEnc, it may be necessary to re-export the original AVI file in VirtualDub with Full processing mode selected from the Video menu. This requires either a lot of disk space or rendering time, depending on the compression settings nominated in the Video > Compression menu.

There are some digital video formats which are incompatible with the Microsoft Windows Driver Model (WDM) and must be converted to another AVI compression format. The free XviD codec is recommended — the installer can be found on the cover DVD.



Sweet as: *BeSweet can be used to convert WAV files to DVD-ready audio, whichever format you use.*



Moving pictures: *video is streamed from the source AVI to the MPEG encoder application, QuEnc.*

When QuEnc has done its work, you will have both an encoded audio file (MP2 or AC3) and an encoded video file (M2V) ready for the final DVD. Next month we take these files and combine them with a custom menu, add some DVD chapters, then burn the final product to disc, ready for playback on a conventional DVD player. EOT

Inside info

- 1394 Digital Video **www.coastweb.de/dv**
- Doom9 **www.doom9.org**
- DVIO **www.carr-engineering.com/dvio.htm**
- WinDV **http://windv.mourek.cz**
- Zwei-Stein Video Editor **www.thugsatbay.com/zweistein**
- VirtualDub **http://virtualdub.org**
- BeSweet **http://dspguru.notrace.dk**
- XviD **www.xvid.org**

Interface intuition

David Williams **explains how to bring back the notion of "user-friendly" in your programming by putting some extra thought into design and code.**

Back in the '80s, it was common to think of some computer applications as more or less user-friendly than others. In many ways, this description has faded into obscurity. Perhaps it's because technologies have become far more standardised — after all, back in the days of DOS, there were few component toolkits to use and no Windows GUI to imitate. Yet the way in which users interact with a program is still important. With modern programming tools making coding more and more accessible, it's time to reinforce some solid concepts.

Skill level

Beginner

Requirements

Borland Delphi 7

Time to complete

1 hour (approx)

Inside info

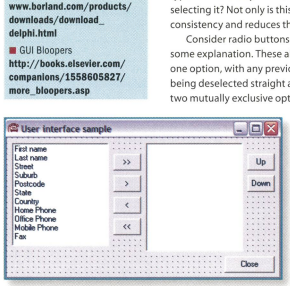
- User Friendly: the comic strip **www.userfriendly.org**
- Delphi trial downloads **www.borland.com/products/downloads/download_delphi.html**
- GUI Bloopers **http://books.elsevier.com/companions/1558605827/more_bloopers.asp**

DESIGNING THE INTERFACE

When coding, think about the tasks users need to perform on each screen. Consider the ways that this design can be built up using common and conventional user interface controls like text boxes and checkboxes. It's important to think carefully about how to capture any needed information, keeping in mind the specific strengths of each different control.

For instance, the user may have to enter information. Is a text box the best choice? That depends on whether they're entering entirely new data. Use a list box or drop-down list if their answers will come from a narrow range of choices. If you're asking for an address, why make users type the state they live in, rather than just selecting it? Not only is this faster, it ensures consistency and reduces the possibility of error.

Consider radio buttons if the choices need some explanation. These allow users to choose one option, with any previously selected option being deselected straight away. If there are only two mutually exclusive options, it's even better to use a checkbox which is either on or off. One exception to this is when asking a person's gender: in this case, it's better to have both male and female radio buttons.



DIY UI: *good user interfaces are built from the standard building blocks of common controls; the user will already know how to use these.*

CHOOSING A SET OF OPTIONS

Most business applications store data and can produce reports based on that information. Thus, it's common to create a way for users to select the columns they want to include in a report.

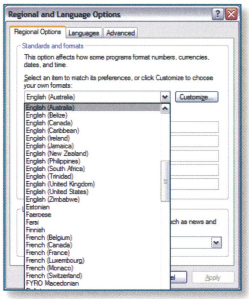
Think about the most efficient way to enable this. You could have a list of columns with a checkbox for each to indicate whether it should be included. But if users want to specify the order in which the columns appear, it's far better to show what the column order will look like than leave it to their imaginations.

One good solution is to provide two lists. One shows the columns available, the other shows the columns selected. When a column is selected it should no longer appear in the available list. Allow selected columns to be moved up or down the list, reflecting their position in the order.

To make things even more user-friendly, allow for multi-selecting, so more than one column can be moved at once. And, in case the user makes a mistake, allow columns to be pushed back to the available list and out of the selected list.

This sounds simple enough, but there's a lot for the programmer to think about. Firstly, the list boxes need to have multi-selections turned on. Obviously the first column can't be moved any further up the list, nor the last down the list, so it's best if these buttons are unavailable once the first or last items are clicked on. Similarly, the buttons to move items from one list to the other should be disabled if a list is empty.

Such a user interface can be quickly built



Dial e: *drop-down lists are easy to navigate; press a letter to jump to the first option with that choice. This makes language setups nothing more than a Tab and an e away.*

by two list boxes and six buttons. Next, add code to the button event-handlers to make it all happen. Here's how to move selected columns from the available list. The code is Borland's Delphi, but the principles are transportable to any language.

```
procedure TfrmMain.bMoveSelectedRightClick(Sender: TObject);
var
  i: integer;

begin
  i := 0;
  while i < lstSourceColumns.Count do
  begin
    if lstSourceColumns.Selected [i] then
      lstDestColumns.Items.Add (lstSourceColumns.Items[i]);
    Inc (i)
  end;

  i := lstSourceColumns.Count - 1;
  while i > -1 do
  begin
    if lstSourceColumns.Selected [i] then
      lstSourceColumns.Items.Delete (i);
    Dec (i)
  end;

  if lstSourceColumns.Items.Count = 0 then
    DisableLeftButtons;
  TurnOnorOffUpandDown
end;
```

To move a selected item up the list, enter:

```
procedure TfrmMain.bMoveUpClick(Sender : TObject);
var
  i: integer;
  swapStr: String;

begin
  i := 1;
  if lstDestColumns.SelCount > 0 then
  begin
    while (not lstDestColumns.Selected [i]) and (i < lstDestColumns.Items.Count - 1) do
      Inc (i);

    if lstDestColumns.Selected [i] then
    begin
      swapStr := lstDestColumns.Items [i - 1];
      lstDestColumns.Items [i - 1] := lstDestColumns.Items [i];
      lstDestColumns.Items [i] := swapStr;
      lstDestColumns.Selected [i - 1] := True
    end
  end;
  TurnOnorOffUpandDown
end;
```

The rest of the program code can be found at **www.apcmag.com/info/workshopcode**. Pay particular attention to the manner in which the selection arrows and the up and down buttons turn on or off when they aren't applicable.

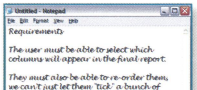
It's this sort of additional attention to detail that makes one program stand out from another. Some time and hard work invested in designing the interface will certainly pay off later, because you'll need to write far less debugging and troubleshooting code.

Quick list navigation

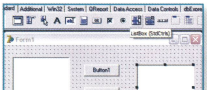
Have you ever come across a drop-down list with a huge number of choices? Anyone who's installed Windows has in the regional settings options, which include an enormous number of language choices. The default is invariably US English. But don't reach for the mouse yet! Why scroll through that list when all you need to do is press the e key to jump to English (Australia).

This works because all drop-down lists using native Windows controls accepts keystrokes, jumping straight to the first entry in the list starting with that letter. Pressing the key again jumps to the next entry in the list starting with that letter. Happily, Australia is the first entry in the range of English variations and thus a simple e does the trick.

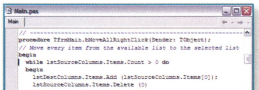
Of course, many people totally ignore this part of the Windows' setup and simply click Next, leaving the default as it is. And that's a far worse crime than taking a few seconds more than absolutely necessary by choosing to use the mouse.



1 *Identify the functionality needed.*



2 *Build an interface using common controls.*



3 *Wire up the event-handlers.*

Get more from your ISP

Are you making the most of your ISP? *Stephen Withers* looks at extra features that can speed up your connection and give you Net access while travelling.

Most people rely on their ISP for basic Web connectivity, but some providers offer their clients a selection of useful extra services for a small fee, or even for free. These range from helping to keep nasties away from your computer to Internet access while you're overseas.

SPAM FILTERS

A good spam filter on your ISP's systems is very valuable, as it can decrease the amount of data transferred to your computer. Some people don't use this as they want to be sure they receive all their mail, but many filters provide a Web-based interface so you can check blocked messages.

VIRUS FILTERS

Virus filtering at the ISP doesn't invalidate antivirus software, but does provide extra protection and reduces the risk of a new virus getting in before you update the signature files.

FIREWALLS

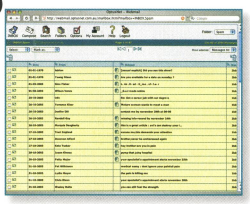
An ISP-based firewall can block unwanted traffic before it chokes your bandwidth. It's no replacement for firewalls at your end, though, as you may want to ensure applications can't access the Internet without your knowledge or block data transmission.

STATIC IP ADDRESSES

A static IP address makes it a lot easier to access a server on your premises from the Internet, assuming that's allowed under the contract with your ISP. Some broadband providers allocate a static IP as a standard feature of certain plans.

A numeric IP address is okay if you're the only one using it to phone home via Terminal Services or to access your mail server when you're travelling, but it's a lot friendlier if you associate a domain name with the IP address.

A conventional DNS server can only link a domain with a static address, but dynamic DNS services work with dynamic IP addresses.



Taking out the trash: *spam filtering at your ISP can keep a lot of junk away from your computer.*

BACKUP DIALUP ACCOUNT

Cable and ADSL are great, but what do you do when you're travelling? Pricing plans for mobile broadband systems such as iBurst and the mobile phone-based systems (GPRS, 1xRTT and 3G) don't suit occasional users, and there isn't always a Wi-Fi hotspot where you need one.

Dialup access is a flexible fallback, especially as it can be used with a mobile phone. Some ISPs, like Dodo, offer free dialup access when your broadband connection isn't in use, while others (including Telstra) impose time charges.

ROAMING

Several ISPs belong to international consortia that let you connect using your normal login credentials at local points, though you will pay a high rate. The two main organisations are GoRemote (formerly GRIC) and iPass.

PEERING EXCHANGE

Peering is when ISPs and other organisations interconnect their network at particular locations so traffic between them doesn't travel across the usual backbone connections. Costs are reduced, so such traffic may be exempt from metering.

GAME SERVERS

Online gamers put a premium on ISPs that run their own servers. Netspace, BigPond and Internode offer them at no extra charge.

Skill level

Beginner

Requirements

None

Time to complete

None

Inside info

- Dynamic DNS **www.technopagan.org/dynamic**
- Dynamic DNS Providers List **http://dmoz.org/Computers/Software/Internet/Servers/Address_Management/Dynamic_DNS_Services**

	BigPond www.bigpond.com	OptusNet www.optusnet.com.au	OzEmail www.ozemail.com.au	iiNet www.iinet.com.au	Primus www.primus.com.au
Spam filter	$2.50 per mailbox, per month	Free	N/A	Free	$4 per account, per month (also includes virus filter)
Virus filter	$2.50 per mailbox, per month	N/A	N/A	Free	See above
Firewall	N/A	N/A	N/A	N/A	Available as part of the business-grade Secure DSL service
Static IP	$10 per month	N/A	Free with business plans	Free with fixed IP address included with blink BIZ and Voyager accounts	Free with business plans
Backup dialup account	$4.95 per hour ($8 per hour roaming)	N/A	Free with home plans	Free during outages	Free
International roaming	$8 per hour (GoDirect)	N/A	$8 per hour (iPass)	N/A	$8–$36 per hour (iPass)
Peering exchange	N/A	N/A	N/A	Yes	Yes
Game servers	Free	N/A	N/A	N/A	Yes

Amazing March Mega-Specials from MicroGram



12v Mini PC

A tiny barebones PC that is perfect for the boat, car, or any space critical situation.

This mini barebones PC is based on the VIA Eden processor and motherboard. It can operate on 12v or 240v making it ideal for use in boats or cars. A fanless design ensures silent operation. The case measures only 49 x 220 x 165mm. It can take a 2.5" laptop hd or CF card, other devices such as a CDROM can be attached via USB. The integrated motherboard includes VGA and LAN.

Cat 1150-1 $729



RAID Unit

Guard against hard drive failure. Provides hot-swap and auto-rebuild of failed drives without downtime.

Cat 2874-1 $779



PCMCIA to Serial

Add two serial ports to your notebook.

Cat 2726-1 $269



FireWire 800 Card

Add high speed FireWire B to your PC with this PCI card. Also has a legacy FireWire 400 port.

Cat 2998-1 $129



Fingerprint Reader

Provide secure access to a PC by using fingerprints for authentication. Connects to the PC via USB.

Cat 9237-1 $199



Hard Disk Restore Card

Restore the PC hard disk to its previous state on restart. Perfect for Internet cafes, schools, etc.

Cat 17079-1 $139



RFID Controller

Suitable for RFID security applications. RFID readers, electronic door locks, alarms, can all be attached to this unit.

Cat 1008179-1 $269



USB to 5.1 Sound

Perfect for use on a PC or Notebook. Has a 3.5mm and SPDIF connection.

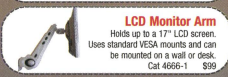
Cat 23025-1 $99



Macro Stick

16 programmable keys that store up to 1000 keystrokes. It is designed to sit above the function keys on a standard keyboard.

Cat 15131-1 $299



LCD Monitor Arm

Holds up to a 17" LCD screen. Uses standard VESA mounts and can be mounted on a wall or desk.

Cat 4666-1 $99



xD Card Reader

An 8 in 1 memory card reader that reads the most common cards used today.

Cat 6786-1 $49



Omni-directional Barcode Scanner

An affordable, vertically mounted small footprint, omni-directional laser scanner which is ideally suited to super market checkouts and the like.

Cat 1008085-1 $999



Extend USB 50m

Use inexpensive network cable (not included) to extend any USB 1.1 device up to 50m from a PC.

Cat 11666-1 $105



Video to VGA

Display any Composite or S-Video signal onto a CRT monitor.

Cat 3479-1 $199



Removable SATA Rack

Backup your data onto a SATA HD and keep it offsite. Easy to use and install.

Cat 6787-1 $139



KVM Switch

Control two PCs with one keyboard, monitor, and mouse. Comes with 1.2m cables.

Cat 11668-1 $129



Wireless Hotspot

Allow users to access the Internet over a secure wireless link. Great for cafes, libraries, conference rooms etc.

Cat 11451-1 $1199



12.1" LCD Monitor

Great for use in a car, boat, or for POS applications. Runs off 12v or 240v.

Cat 4658-1 $969



RS232 to RS485

Convert RS232 to RS485. Runs up to 1200m and works in half or full duplex.

Cat IC485S-1 $129



Cordless Mini Keyboard

A black, 88key keyboard, includes a pointing device. Great for when space is an issue.

Cat 8750-1 $179



USB to PS/2

Attach a PS/2 keyboard and mouse to a USB port. Multiple units can be attached to one PC or Notebook.

Cat 15094-1 $159



Bluetooth Barcode Scanner

A CCD cordless scanner that uses Bluetooth. Comes with Bluetooth dongle. Requires AA batteries (not included)

Cat 1008178-1 $799

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SYDRE.AD.MGRAM.0305

Plug in to the power of ActiveX

One common feature of professional, scalable programs is the ability to include a range of optional modules or "plug-ins". *David Williams* shows how to achieve this in your code, too.

On the cover DVD

Bonus DVD software

Breakout • Reversi • GAMEMANAGER.EXE. Files can be found under "From the Mag".

Skill level

Intermediate

Requirements

Visual Basic 5 or 6

Time to complete

1 hour (approx)

Inside info

- VB ActiveX programming forum
  www.tek-tips.com/threadminder.cfm?pid=708
- Delphi trial downloads
  www.borland.com/products/downloads/download_delphi.html

In the '90s, the University of Newcastle had a first-year subject which taught IT concepts and gave practical exposure to Microsoft's Word, Excel and Access. This subject had up to 900 students every semester, with a practical test in each package.

The university developed automated tools to generate tests and grade them using a common set of routines for uploading marks to central information systems. If these changed, all other programs had to be recompiled. Also, computer education changed and there was no longer any place for teaching Microsoft Word at a university. Instead, they started teaching Microsoft Project, necessitating new code and deployment.

A BETTER SOLUTION

The university needed a single program that managed lists of students and subjects, generated tests, graded submissions and uploaded results without being constrained by the software.

The system was reworked to make one, and to convert the test generators and markers into ActiveX DLLs with a consistent set of interfaces. The main program detected all DLLs available to it on any given computer and dynamically constructed menus to suit.

All the logic for making and marking tests for specific products were bundled into these DLLs. Supporting a new product simply meant generating a new DLL and dropping it into a disk directory on each computer using the system; the main app had no need for recompilation.

MANAGING A LIBRARY OF GAMES

Alas, that code is proprietary and can't be shared, but the concepts are so straightforward they can be reproduced for any purpose. In this case, imagine a "Game Manager" — a front-end system that provides a simple menu of a suite of games, and allows for more games to be added in the future.

1 This month's cover DVD includes complete Visual Basic code for two public domain games, Breakout and Reversi. These are entirely standalone, written by two different programmers. Converting them into plug-in modules means you have to consider the common methods they must expose to be used by the main app, and then modify the original programs to conform to this. There's no need to rework the games themselves; there'll be no difference between the plug-in version of the game and its standalone equivalent.

For the Game Manager, three methods would be useful:

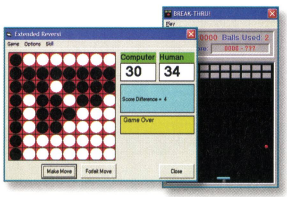
playGame	invoke the game
getName	return the game's name (for use in menus)
getVersion	return the game's version

Now it's time to convert the games into DLLs and add these methods.

REVERSI UNPLUGGED

Start Visual Basic and elect to create a new project of type ActiveX DLL. A blank class file is displayed; this is where the DLL's methods and properties are coded.

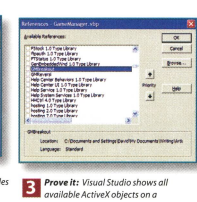
2 Click File > Add Project and open the REVERSI.VBP project from the cover DVD. This causes Visual Basic to set up a project group,



1 ***Serious code:*** *find Visual Basic code for classic games on the cover DVD, then turn them into plug-in DLLs.*



2 ***See it all:*** *using a project group, all files making up the DLL and .EXE projects can be seen at a glance. Use a sensible, consistent naming scheme for the DLLs.*



3 ***Prove it:*** *Visual Studio shows all available ActiveX objects on a machine. Use it to prove that the plug-in DLLs compiled and registered successfully.*

containing both the new and existing projects. Expand all nodes in the project inspector, where all the files Reversi is comprised of are listed. It consists of both a form and a module, the main form being frmReversi.

Right-click on the new project and select Add Form and Add Module respectively to put the existing form and module into the new project. This means the one body of code is being used for both projects.

Give the new project a sensible name as ActiveX DLLs are registered using their project and class names and the default, "Project1.Class1", isn't very intuitive.

A consistent naming scheme will also help the main program determine which DLLs do and don't belong to it. Use a scheme like "GMgamename.Game", so the class will be called "Game" for each ActiveX DLL, and the project will be called "GMgamename" for each game.

Rename the project to "GMReversi" and the class to "Game". Even though no code has been written yet, the process is half over. Click into the class module to implement the desired methods and properties.

```
Public Property Get getName() As
String
    getName = "Reversi"
End Property
```

```
Public Property Get getVersion()
As String
    getVersion = "Reversi
v" & Str(App.Major) & "." &
Str(App.Minor)
End Property
```

```
Public Sub playGame()
    frmXReversi.Show
End Sub
```

There's nothing complex about this code; the `playGame` method just invokes the main form for the game — just as if it had been the startup form as it is in the normal .EXE. The two properties return the name and version of the game.

Click File > Make GMReversi.dll to build and compile the DLL. Follow the exact same steps to make a DLL version of the Breakout game — or check out the pre-built copy on the cover DVD.

Use the Project > References menu to prove the ActiveX DLLs have been compiled and are registered with Windows.

CODING THE GAMEMANAGER

Two ActiveX DLLs exist, but there's nothing you can do with them yet as the Game Manager doesn't exist. This needs to find the plug-in modules when it starts and make them available without the end user even realising they're in separate files. Using a consistent naming scheme makes things easier; the code just searches for files named GM*.dll. Then, for each one, try and create an instance of an object of the form GM*.Game. If that succeeds, then it must be a valid plug-in with the necessary functions:

```
Public colPlugIns As Collection

Public Sub FindPlugIns(ByVal
PlugInPath As String)
    Dim strFileName As String

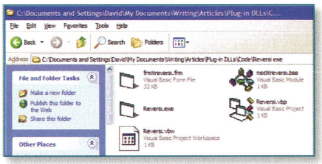
    Set colPlugIns = Nothing
    Set colPlugIns = New Collec-
tion
    strFileName = Dir(PlugInPath
& "\GM*.dll", vbNormal)
    Do While strFileName <> ""
        If PlugInExists(strFileN
ame) Then
            colPlugIns.Add
strFileName
        End If

        strFileName = Dir
    Loop
End Sub

Private Function
PlugInExists(strFileName As
String)
    As Boolean
    Dim strCreateString As String
    Dim vDummy As Object

    On Error Resume Next

    strCreateString = MakeObjectF
romPath(strFileName)
```



4 ***No mirrors here:*** *the Reversi game is just a "normal" Visual Basic project and a corresponding compiled, executable file.*

```
    Set vDummy = Nothing
    Set vDummy = CreateObject(str
CreateString)

    If vDummy Is Nothing Then
        PlugInExists = False
    Else
        PlugInExists = True
        Set vDummy = Nothing
    End If
End Function

Public Function MakeObjectFromPat
h(strFileName As String)
    As String
    MakeObjectFromPath = ExtractF
ileName(strFileName) & _
    ".Game"
End Function
```

Once the Game Manager has discovered all the plug-ins, it can be as sophisticated as you want; code for a simple version is included on the cover DVD.

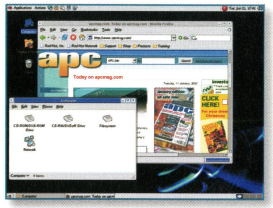
The button to play a game merely makes an instance of an object; enforcing a consistent naming scheme means the code can be confident all plug-ins have a class named Game with a playGame method. 3 Inspect the Game Manager code; there's no reference to specific DLLs, nor does it have any built-in knowledge of the games. The number of possible DLLs is unlimited.

REGISTRATION

Visual Basic registers ActiveX controls with Windows when they're compiled. Deployment tools like InstallShield also look after registration. If a DLL is manually copied onto another computer, it has to be registered manually using the DOS command `REGSVR32` (e.g., `REGSVR32 GMReversi.DLL`). HTH

Mastering Linux, part 4

In part 3 of his Mastering Linux series, *Jarrod Spiga* demystified the command line console. This month he turns his attention to the X Windows desktop on Fedora Core 3.



1 *GNOME is the environment that will load up by default under Fedora Core 3. KDE is the other environment that is often used, and is similar in most aspects.*

On the cover DVD

Bonus DVD software

Linux commands cheatsheet • Mastering Linux PDFs, parts 1, 2 and 3. Files can be found under "From the Mag".

Skill level

Beginner

Requirements

PC with DVD drive
• Internet connection
• printer (optional).

Time to complete

2 hours (approx)

In this series . . .

Part 3 — Feb 05
Console basics

Part 4 — Mar 05
The X Windows desktop

Part 5 — Apr 05
Command line in-depth

. . . and more

In most cases, you'll be taken to the Linux Graphical User Interface upon boot up. And even though part 3 of this guide (*APC* February, page 98) steered clear of the GUI when it looked at the command line console, by this stage you've probably logged into the GUI a few times and experimented with some of its features.

This fourth instalment details some of the basic aspects of the Linux GUI. This may include things you've already discovered yourself, but there are also nuggets of information that will help you use the GUI more effectively.

THE ENVIRONMENT

Unless you've customised your Fedora installation, the default X Windows environment should be the GNU Network Object Model Environment (GNOME). An X Windows environment can be thought of as the graphical equivalent to the shell under the command line. An environment is a skin that defines how windows in the GUI are handled, how the user can interact with the windows, and what functionality is available to the user.

There are a number of environments that can be used with X Windows (sometimes called Windows Managers). The default is GNOME, but the K Desktop Environment (KDE) is another that can be installed with Fedora. As with shells, there are differences between each environment.

1 On the Fedora installation, the actual differences between GNOME and KDE are minimised by design. Red Hat has retooled both KDE and GNOME so that they look and behave very similarly in order to make using Linux much easier. However, load the two environments on a different distribution of Linux and it won't take long to find dozens of differences.

The primary reason GNOME is used as the default graphical environment from within Fedora Core is because most of its administrative tools have been specifically developed for use with GNOME. But that's not to say that they won't run under KDE. One of the reasons Red Hat retooled KDE for Fedora Core was so the administrative tools would also run. KDE is available with a number of other distributions of Linux, as well as most instances of Unix, which allows people who use a number of different Unix/Linux machines to maintain some familiarity between them.

For the most part, this instalment focuses on GNOME, though most of what is described should also work under KDE. Any major differences between methodologies using each environment will be highlighted.

LOGGING IN

Log in to X Windows in exactly the same way as you logged in to the command line console. In most cases, the Linux system should boot up to the Fedora Core graphical login screen.

As described in part 2 of this series (*APC* January, page 98), logging in is as simple as typing a valid user name, hitting Enter, then the corresponding password, then Enter. However, there are a number of other buttons at the bottom of this screen worth mentioning. They are:

■ **Language:** allows a user to change the language for their desktop session. This is useful for computers with several users who speak different languages.

■ **Session:** lets users select the environment for each session. This option lets you quickly switch to a different desktop environment. If you select an environment that's different from your default, a list of instructions will appear telling you what to do to set your newly selected environment as the default.

■ **Reboot:** allows users reboot the system without having to log in, unless the system has been configured so that you can't.

■ **Shut down:** lets you shut down the system in a similar way to the Reboot button.

YOUR DESKTOP

Once you've logged on to the system, the desktop should display. The main components of the GNOME desktop are:

■ **The GNOME menu:** the Red Hat icon that appears in the top left-hand corner is the

GNOME menu (it should also have a text label of Applications). It acts in the same way as the Start button within Windows — click on it and a menu drops down containing the launch applications.

■ **The Actions menu:** among other things, this button allows you to log off, switch off or restart the system, lock the screen, take screenshots and run other applications.

■ **Application launchers:** much like Windows' Quick-Launch bar, application launchers allow you to load frequently used programs with a single mouse click. By default, you'll be able to launch the Mozilla Web browser, Ximian Evolution email client, OpenOffice.org's Writer (similar to Microsoft's Word), Impress (a presentation package similar to PowerPoint) and Calc (a spreadsheet application like Excel).

■ **The notification bar:** appearing in the top right-hand corner of the screen, the notification bar displays the current system time as well as icons which display information about your system or give you easy access to frequently changed settings.

■ **The taskbar:** with every application you open on your current virtual desktop, a button that represents it will appear on the taskbar at the bottom of the screen.

■ **The workspace switcher:** this refers to the four squares used to represent the four workspaces set up for you by default. You can increase or decrease the number of virtual desktops available.

■ **Desktop icons:** a few desktop icons are also present for quick access to some aspects of the file system. The "Computer" icon, for instance, is designed to mimic the My Computer icon under Windows. The Home and Trash directories are also easily accessible from your desktop, as is an icon for any removable media you may have on your system. For example, if you insert a CD or DVD into the optical drive, an icon for it will appear on the desktop.

WINDOW CONTROLS

2 The basic controls in the title bar of most windows within GNOME are usually the same as they are in Microsoft Windows. The Windows Management Menu button (at the top left) has typical move, resize, minimise, maximise/restore and close options, but there are a couple more. These are:

■ **On top:** this forces the current window to always be on top of any other windows.

■ **Put on all workspaces and Move to another workspace:** these affect which workspaces the current window is visible on.

The Minimise, Maximise and Close buttons are also present in the title bar. Double-clicking on the title bar will maximise/restore the window by default, as it does under Windows. However, if you're used to using a Mac, you can change this behaviour so that double-clicking the title bar rolls the window up by going to GNOME > Preferences > Windows.

From this same preferences screen, you can also change the way windows are selected. By enabling Select windows when the mouse moves over them, you can flick through open windows at a much faster rate, although this does take some getting used to.

VIRTUAL WORKSPACES

In the bottom right-hand corner of the screen there are four rectangular boxes side-by-side in the taskbar. These four panes represent the four default virtual workspaces running under X Windows.

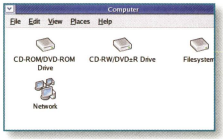
Under Windows, even features such as application grouping within the taskbar and tabbed Web browsers often don't quite do enough to minimise the layers of open windows on the desktop. Using GNOME, the virtual workspaces feature makes all these windows easier to manage by giving you a set of unique desktops that can be worked with at any given time. Imagine virtual workspaces as the GUI versions of the virtual consoles covered in part 3 of this guide. Each virtual workspace can hold its own applications, have its own desktop wallpaper, and so on.

3 When you first log in to Fedora Core, all applications will run on the left-most virtual workspace. To switch over to a different workspace, simply click one of the other three virtual workspace boxes. Alternatively, Ctrl+Alt+Left arrow switches to the workspace to the left of the current one, Ctrl+Alt+Right arrow switches to the workspace to the right, and so on.

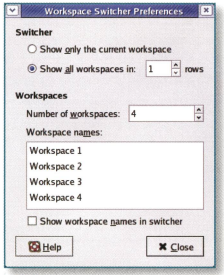
WORKSPACE BEHAVIOUR

If you switch to a different virtual workspace and launch an application, that application should be visible only on that workspace. Switch to a different workspace and your application will no longer be visible, nor will it appear in your taskbar. But the program is still running — if you switch back to the workspace from which you launched it, you should be able to work with it again.

If you want to move an application from one virtual workspace so that it's visible on another, click on the Window control menu



2 *Double-clicking on the Computer icon on your desktop loads a File Manager window that contains icons for the drives in your system along with a network browser icon.*



3 *The Workspace Switcher Preferences let you create additional workspaces to go with the four that are set up by default. You can also specify the manner in which workspaces are arranged and assign a unique name to each workspace.*

(in the top left corner of the window) and select Move to Another Workspace, followed by the workspace you want to move the window to. Other options usually available in this same control menu include Move to Workspace Left/Right/Up/Down and Put on All Workspaces. The last option allows your window to be visible across all virtual workspaces.

If you prefer the speed of using keyboard shortcuts, Shift+Ctrl+Alt+Left arrow will move the current window to the workspace to the left, and so on.

WORKING WITH FILES AND DIRECTORIES

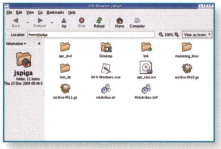
The command line allows you to perform a variety of file and directory management tasks, while the X Windows File Manager also lets you perform all of the functions from within X Windows.

The File Manager is running whenever you are logged in to X Windows, even if you can't see it in the taskbar. The desktop ▶

itself is one of the forms that the File Manager can come in, because each file or directory created on your desktop is stored on the file system beneath the Desktop directory located under home.

Under GNOME, the File Manager is an application named Nautilus; under KDE it's called Konqueror. Since this guide assumes you're running GNOME, it's based on the use of Nautilus. However, most of the steps described also apply to Konqueror. Differences between the applications are pointed out.





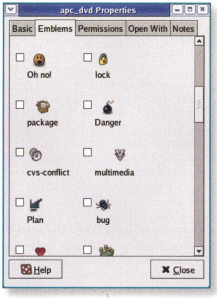
4 & 5 *Here we see the Nautilus file browser and file manager screens. The file browser acts more like Windows Explorer, with a pane that provides information on the current or selected items.*

4 & 5 To view a more traditional File Manager window, double-click the icon on the desktop that represents the home directory. A new window pops up that will contain a number of files and directories, depending on how much you've been using the Linux system.

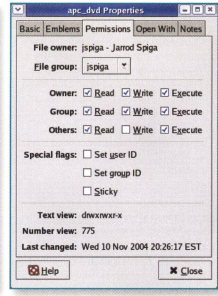
Most of the actions performed under Windows Explorer also apply to the Linux File Manager — double-clicking on a file opens it with the application associated with the file's extension, Ctrl+C copies a file, Ctrl+X cuts a file (for moving) and Ctrl+V pastes the copied or cut file in the current directory.

Each file and directory has its own icon representing the type of object. For instance, each directory is represented by a folder icon, compressed files by an icon of files inside a box, and My Documents by pen and paper icons.

Icon overlays can also be applied in certain circumstances. The jspiga home directory (see left) has a symbolic link that points to another directory on the file system. A small green arrow overlay appears on the bottom right corner of the directory icon, indicating that this is a symbolic link and not an actual directory. Similarly, if you navigate to an area of the file system you don't have access to, the icons in that directory will have a "forbidden" overlay.



6 *Emblems (or Icon Overlays) can be applied as a symbolic note on file system objects. These overlays are only visible within the GUI — from a command line you won't see any difference.*



7 *Use the Permissions Properties tab to set the ownership and permissions for each, or a group of file system objects, allowing you to forget about the permissions numbering convention.*

ICON DO THAT

You can bring up a context menu for any icon by right-clicking on it. This menu normally allows you to perform a number of functions. For example, if you want to open a file with an application not associated with the file's extension, select Open with Other Application. You can also view the properties of a file or directory by selecting the Properties option in the context menu.

8 When the Properties screen comes up, you can see the size of the file, its location, and when it was last accessed and modified. The next tab permits you to attach an emblem to the file or directory. An emblem is a mark that can be applied to a file system object only in the GUI to help users identify the object more easily. It has no real purpose other than to assist with usability.

7 The Permissions tab is most important as it allows you to easily define the permission for the file system object — no more remembering number codes for setting permissions (although it's still a good idea to remember how to set the permissions from the command line, in case you don't have access to X Windows).

The permissions screen also allows you to change the file owner and file group, providing you have sufficient access to do so. Some special flags can also be selected, but don't worry about them for the moment — the use of these flags is an advanced topic that will be covered in a future instalment in this series.

The remaining tabs don't really affect the file system object directly. The Open With tab allows you to define what additional applications can be used to open a file, while the Notes tab gives you the chance to write any additional notes about the file, although they're stored outside of it.

NATURAL SELECTION

9 Multiple files can be selected at once within the File Manager in several ways. One is to click on a space in the File Manager that isn't occupied by an icon, then drag a box around all of the files you wish to select. Alternatively, Shift+clicking an icon selects all icons located between the previously selected icon and the icon you clicked on, while Ctrl+clicking adds or removes icons from the selected list one at a time.

DRAGGING AND DROPPING

While some users prefer to use keyboard

shortcuts or context menus, dragging and dropping is a quick and powerful method, especially when it comes to copying or moving files or directories.

A quick and easy way to move a file from one directory to another is to load up two File Manager windows, with one looking at the source directory and the other at the destination directory. Then simply drag the file from the source directory into the destination directory.

If you only want to copy the file to the destination directory, just follow the same steps while holding down the Ctrl key. Alternatively, if you hold down the Alt key while doing this drag-and-drop action, a context menu will appear which includes the ability to create a link to the file in the destination directory.

DELETING FROM THE GUI

One of the warnings in part 3 of this series in relation to working with the command line console was that many actions are irreversible. In particular, when you delete something from the command line, it's gone forever.

Things are somewhat different under the X Windows GUI, however. Delete a file from anywhere in the file system and instead of being transformed into the ether, it will be moved to the Trash folder on your desktop.

The Trash folder behaves in much the same way as the Recycle Bin folder under Windows. Open it and you'll be able to see all deleted files and directories. This gives you a second chance to restore files to their original location if they're accidentally deleted from within the GUI. However, once you delete an item from Trash, it's gone for good.

LOGGING OUT

When your Linux session is finished, it's a good idea to log out of the system to prevent another user exploiting the open session and messing around with your data.

To log out, select the Actions menu option followed by Logout. You'll be given three options: to completely shut down the system, reboot it, or just log out. It's up to you, but all three options log you out of the system.

The check box that appears just above these options permits you to save your current desktop setup. When selected, the location of all icons and desktop items are saved in your user profile, and will display the next time you log in to X Windows. LUTH



8 *Drag a box around multiple items to select them. Use the Ctrl key to select/deselect single items, and use the Shift key to select/deselect all items between the last selected item and where you click.*

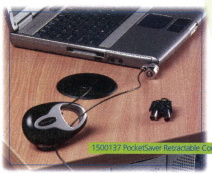
Next month . . .

Next month's Mastering Linux installment goes back to the command line and explains how to create, edit and save files with text editors. It also begins to demonstrate some of the administrative tasks that will allow you to use your Linux PC to its full potential.

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Downtime

High-performance playtime

Prime time monitors

***Dan Warne* goes off his trolley about the arrival of LCD/television monitors in supermarkets.**

Samsung 930MP



▲**Upsides:** Samsung's 19in Dell-killer LCD TV/monitor has a tuner that also handles FM. An inbuilt card reader can play a number of file formats without the help of a computer, including MP3, AVI and MPEG. Inputs include VGA, DVI, S-Video, SCART, Component and antenna. Excellent contrast ratio of 1,000:1. Three-year warranty.

▼**Downsides:** response rate of 25ms — don't expect to use it for gaming.

Details	
Online	www.samsung.com.au
Price	$1,599
Verdict	★★★½☆

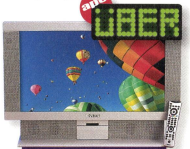
Dell W1900 LCD TV



▲**Upsides:** it's Dell's first foray into home entertainment, a 19in high-definition LCD TV. It has composite, DVI and VGA inputs, a 1,280 x 1,024 resolution, dual 7W speakers, picture-in-picture and the ability to split the screen so you can use half as a monitor and half as a TV. If something goes wrong, Dell will courier a replacement to you the next day.

▼**Downsides:** the 25ms response rate and 600:1 contrast aren't too flash. Only comes in 19in. Analog tuner. One-year warranty.

Details	
Online	www.dell.com.au
Price	$1,449
Verdict	★★★☆☆



Tevion wide-screen LCD TV 68.5cm

▲**Upsides:** Aldi is one ambitious discount grocer, pushing well priced LCD TVs into the hallowed halls shared by fruit and veg. This ripper of a TV doubles as a 1,280 x 720 resolution monitor. It has six speakers, an inbuilt analog tuner and low 16ms response time.

▼**Downsides:** one-year warranty and 600:1 contrast ratio, but who's complaining at this price?

Details	
Online	www.aldi.com.au
Price	$1,999
Verdict	★★★★½

iPod Shuffle

apc 1337



▲**Upsides:** fantastic value — 512MB for $149 or 1GB for $229 beats competitors by miles. But what makes this "screenless" player even more attractive is Apple's iTunes PC/Mac software, which monitors the songs you listen to the most, and automatically creates a playlist of your favourite tracks. (You can also define your own playlists.) Comes with an inbuilt USB 2.0 connector and uses a 12-hour rechargeable battery. It's the only flash player that will be able to play iTunes Music Store downloads... when Australia eventually gets it.

▼**Downsides:** can't connect to existing iPod accessories. You take pot luck on the track you're playing.

Details	
Online	www.apple.com.au/ipodshuffle
Price	512MB, $149; 1GB, $229
Verdict	★★★★☆

Goodbye line rental

The advent of mobile phone plans that let you make $200 worth of calls for $49 is creating a whole new generation of microwaved youngsters. Now, Ericsson wants to let you make calls over your mobile without being anywhere near it. It has released a range of home phone GSM gateways that allow you to plug in a normal landline phone and make calls over GSM or CDMA, depending on the model. They work with any regular analog phone, including cordless ones. For people who use their home phone only lightly, the combination of one of these "fixed cellular terminals" with a capped calling plan may end up being cheaper than having to pay $30 to maintain a home phone line each month. The up-front price is a bit exxy at $636 though.

www.powertec.com.au

LEGEND

Downtime ratings

apc uBER — **Super, super cool**

apc 1337 — **Super cool**

apc n00b — **Uncool, (as in newbie)**

Isn't it iconic?

Who said a picture is worth a thousand words? *David Emberton* plays around with three of the newest smartphones and wishes they had some tooltips.

Motorola A1000



▲**Upsides:** has a VGA video camera at the front and a 1.2 megapixel still camera in the back. Handwriting recognition is well integrated, and the interface looks great. Not too heavy and attractively styled, with a bright 208 x 320 TFT.

▼**Downsides:** lights up like Vegas, complete with tacky illuminated logo. Memory card slot is underneath the battery. Game keys seem handy but are oddly positioned. Retractable stylus isn't stiff enough to stay fully extended.

Details	
Online	www.three.com.au
Price	$979
Verdict	★★★★☆

Nokia 9500 Communicator

▲**Upsides:** awesome internal screen. Has Wi-Fi as well as Bluetooth. Decent-sized keyboard, with easy access menu buttons in the top row. Directional keypad doubles as a mouse pointer in Web mode. Comes with the standard apps, plus a presentation editor.

▼**Downsides:** old school brick design means it's definitely not a fashion accessory. Can only use the VGA camera from the front panel, not main keyboard interface. Slow — the images menu took five seconds to load. Interface is awkward without a touchscreen. Expensive.



Details	
Online	www.nokia.com.au
Price	$2,000
Verdict	★★½☆☆

Sony Ericsson P910i



▲**Upsides:** removable flip-up keyboard. Backlight gently fades out. Includes a cool Jotter drawing/writing app and JPEG editor. Memory Stick Duo slot is easy to access and holds up to 1GB. Handy self-portrait mirror on the back.

▼**Downsides:** interface design is a dog, with confusing screens and drab icons. Touchscreen doesn't work when the keyboard is flipped up. Looks a bit chunky, and the camera is only VGA.

Details	
Online	www.sonyericsson.com.au
Price	$1,599
Verdict	★★½☆☆

Make your own hologram

Have you ever looked at the hologram of Princess Leia in *Star Wars* and dreamed of having the real thing in your bedroom? Neither have we. But now at least you can make your own 3D hologram of her at home. For US$99 plus shipping, the LitiHolo (**www.litiholo.com**) kit includes a laser diode reassuringly named SafetyLight, instant hologram film and a bunch of other things you need to wear a white lab coat to play with. LitiHolo claims it's dead simple and safe to use. Just don't stare straight into the light of 3D Leia in your bedroom for too long or you might go blind.



All pod cons

***Dan Warne* checks out the latest iPod speakers and likes what he hears.**

Bose SoundDock

▲**Upsides:** finally, an iPod speaker system with really good sound. It also charges the iPod while it's docked and comes with a credit card-sized radio frequency remote control.

▼**Downsides:** it's an iPod speaker system and nothing else. There are no external inputs, so if Apple changes its iPod connector in the future, your speakers could become obsolete. This may seem unlikely, but Apple is prone to fickle changes. Remember when it tried to revolutionise the world with its proprietary ADC monitor connector, only to dump it a few years later?



Details	
Online	www.bose.com.au
Price	$499
Verdict	★★★★☆

JBL OnStage

▲**Upsides:** sounds fantastic, with astonishingly rich bass. The inbuilt subwoofer makes good use of the unit's doughnut shape, which also accommodates four small speakers. Comes with dock connectors for every model of iPod (even the original one without the dock connector thanks to the 3.5mm mini-DIN input), which also means you could use it as a speaker for other devices. Looks way cool, like a gadget out of an episode of *Star Trek*.

▼**Downsides:** no remote control. May take off from your desk and try to assimilate you with its proton beam.



Details	
Online	www.apple.com.au/store
Price	$299.95
Verdict	★★★★☆

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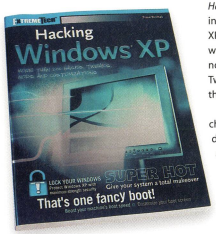
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Hacking Windows XP



Details	
Publisher	John Wiley & Sons
ISBN	0764569295
Price	$38.95

Hacking Windows XP is all about customising, increasing performance and securing your Windows XP operating system. While the title contains the word "hacking", the book focuses on modifying XP, not breaking into it. The author, Steve Sinchak of TweakXP.com fame, has solid credentials and claims that this book is the result of years of research.

Hacking Windows XP is divided into three chapters. The first looks at customising your desktop, navigation, start-up and Explorer. Both amateur and expert users can relax as the book contains a generous number of screen captures. Combined with step-by-step instructions, this book makes it almost impossible for you to turn your PC into a brick.

The second chapter explains how to speed up your computer's performance by doing everything from modifying the BIOS settings and turning off unnecessary services to tuning the Windows paging file. The more technical and risky hacks are outlined, such as modifying the system boot, and it also refers to applications on the accompanying CD to make life easier.

Part three illustrates how to secure a system from intruders, spam, spyware and viruses. It also provides expert advice on clearing those frequently used program and open document lists. While this part merely scratches the surface with regard to Internet security, it provides step-by-step instructions to getting the basics right.

The more technically savvy reader may be forgiven for thinking they know everything about modifying Windows XP. However, Sinchak has a few surprises up his sleeve, such as disabling the file access timestamps and legacy file creation. It's tips like these that make this book stand out from the crowd.

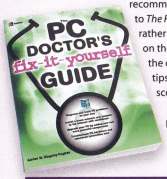
If you're into tweaking your PC you can't go past *Hacking Windows XP*. But once you have all the information, the question isn't so much how to make your PC run faster, but finding the time to make all the necessary mods.

The PC Doctor's Fix-It-Yourself Guide

If you're reasonably comfortable with building computers from scratch then *The PC Doctor's Fix-It-Yourself Guide* probably isn't going to tell you anything you don't already know. It's aimed at semi-computer-literate people who are thinking about upgrading their PC.

The book is divided into four sections. It begins by explaining the anatomy of a PC, reasons for upgrading and some of the resources you need to "fix it yourself". Part two goes into detail about all the components of a PC and how to upgrade them. The third section looks at maintaining your operating system and covers topics such as backups, improving performance and general Internet connection issues. It then concludes with a glossary, a list of useful Web sites and the equipment you'll need to include as a part of your toolkit.

If you're ever asked by friends and family to fix a computer or recommend an upgrade, you can refer them to *The PC Doctor's Fix-It-Yourself Guide*, rather than providing technical support on the phone. This book stands out from the crowd for its examples, hints and tips, which are based on real-world scenarios.



Details	
Publisher	Osborne McGraw-Hill
ISBN	0072255536
Price	$49.95

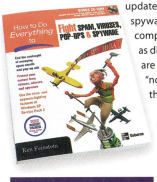
Author Adrian W Kingsley-Hughes provides useful tips throughout the book on everything from BIOS beep codes to how to recognise the symptoms of a failing power supply.

This guide could also be a very useful reference guide for helpdesk and network support staff, or for students looking to work in an IT department.

How to Do Everything to: Fight Spam, Viruses, Pop-ups & Spyware

Spam, viruses, pop-ups and spyware are part of life on the Internet and author Ken Feinstein focuses on reducing these risks. *How to Do Everything to: Fight Spam, Viruses, Pop-ups & Spyware* begins with basic tips on avoiding spam and covers the antispam features of Outlook 2003, AOL, Yahoo!, EarthLink and MSN. As well as being a little US-centric, this section is disappointing as there's no mention of RBLs, Bayesian filtering, spam fingerprinting or popular antispam products. It also fails to distinguish between spam filtering programs that delete mail from the server and those that download spam and perform the filtering in your inbox.

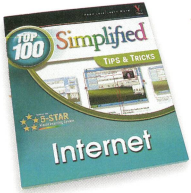
The book explains how to fight viruses, spyware and adware and has tips on recognising malicious file attachments and what to do if your PC is infected. Unfortunately, it's dominated by configuring Windows updates and lacks concrete examples of what spyware and adware actually do to your computer. Feinstein mentions threats such as diallers, but doesn't explain what they are or how you'd get one. He says they are "not necessarily all bad things". Try telling that to people who have fallen victim!



Details	
Publisher	Osborne McGraw-Hill
ISBN	0072256559
Price	$39.95

The final section outlines the different types of pop-ups and how to block them in MSN and AOL, as well as using apps such as the Google toolbar. This is useful for novices who may not know they can get a free pop-up blocker for their PC. But if you've been using the Net for more than 12 months, you've probably moved beyond the scope of this title.

Internet: Top 100 Simplified Tips & Tricks



Over-designed and under-informative, this book gets off to a bad start — and fails to recover. Tip number one of 100 describes how to use a US-based Web site that requires you to sign up for a so-called "bandwidth test". This, like many of the tips that follow, is unlikely to be of any use to an Australian reader — especially if you're not prepared to register for a service you don't need and can't use.

Tip two also advises you to increase the size of your browser cache to speed up your Internet connection — an appalling recommendation! Things don't get any better either, with almost half the tips in chapter one requiring software downloads from specific vendors.

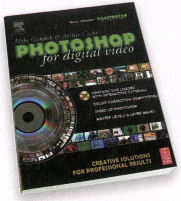
Considering that the book is aimed at the "visual learner who already knows the basics of email, Web surfing and shopping online", the information presented is just too basic and, in many cases, too vendor-specific. Whole chapters could have been reduced to a page of tips, leaving room for more genuine tweaks. Instead there's an emphasis on installing dozens of applications that purportedly do the tweaks for you. And does anyone really need two pages dedicated to opening multiple browser windows with Ctrl+N? There are plenty more examples just like this.

If you're completely new to computers and the Internet you may glean some helpful tips. But if you've clocked up more than a few hours of surf-time, these top 100 tips and tricks will be just too darn simplified.

Details

Publisher	John Wiley & Sons
ISBN	0764574740
Price	$33.95

Photoshop for digital video



This book fills a niche that is typically missing from most Photoshop tutorials. Because it addresses graphic design techniques that specifically cater to video output, it's perfectly suited to both the graphic designer and the videographer. There is broad coverage of video technicalities such as aspect ratios, deinterlacing, colour correction, pixel ratios and using broadcast-safe colours. Plus there are dozens of practical examples — like preparing stills for animation, freeze frames, montages and composite masking. This is all well supported with comprehensive walk-throughs that are both logically organised and appropriately illustrated.

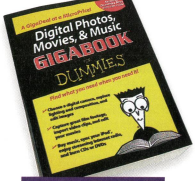
Although the focus is without doubt on video production, there is a wealth of knowledge for designers working with print- and Web-based output as well. For example, there's an excellent section on typography which is supplemented by a chapter dedicated to creating DVD menus. While the DVD menu techniques are applicable to any authoring package, there are additional tips for optimising Photoshop files for use with Encore (Adobe's companion DVD authoring package). Similarly, there's a bonus chapter on using Adobe Illustrator for digital video.

Other techniques include the creation of virtual sets, banners, pseudo-3D effects, textures and backgrounds. There are also advanced guides to using Photoshop paths, masks, blending layers and other standard design techniques. Although priced at the higher end of the spectrum, the book contains 340 full-colour pages, none of which are wasted. For professional-quality video design, look no further.

Details

Publisher	Elsevier/Focal Press
ISBN	0240806336
Price	$85.25

Digital Photos, Movies, & Music Gigabook for Dummies



This massive volume is four books rolled into one, covering digital photography, video making, digital music and CD/DVD recording. The tone will be a little too conversational for many readers, but this doesn't detract from the quality of the content. Plus, with a screenshot on almost every page, you can get by without ever being in front of a computer.

It's the sheer quantity of information in *Digital Photos, Movies, & Music Gigabook for Dummies*, however, that is most impressive. For example, the photography section contains detailed advice about shot composition and tripod usage as well as a full breakdown of editing procedures. Unlike similar textbooks, it also discusses a variety of software alternatives, giving generic examples and techniques that are useful regardless of the applications you own or intend to use. The video, music and CD/DVD sections are equally informative and cover hardware upgrades as well as software comparisons and step-by-step techniques.

As with most titles in the *Dummies* series, there is simply nothing missing. Whether you use a Mac or Windows, it comprehensively covers the preparation stages, hardware options and software issues, all clearly explained with easy-to-understand instructions. And when you're done, the CD/DVD authoring section provides a full range of options and instructions for creating interactive data and video disks for both home theatre and the PC. Highly recommended for the beginner and experienced user alike.

Details

Publisher	John Wiley & Sons
ISBN	0764574140
Price	$57.95



Candid camera: *an unnamed frontbencher parties during Schoolies Week.*



The Apprentice: *Frieda lurks by Trump Tower waiting for the real head vampire.*



Home shooting network: *"Order the assault rifle now, and get a free bracelet worth $50!"*

Vampire: The Masquerade – Bloodlines

How do you make a vampire game that doesn't suck in all the wrong ways? *Justin Kranzl* reckons this game finally garlicks the problem.

Forget some toothy geezer in a cape and remote castle surrounded by superstitious peasants, these days just about all the haemoglobin-sucking action takes place in the city. This urbanisation of the vampire has been underway for years, not only in film but also in role-playing games such as White Wolf's Vampire: The Masquerade series. That was so popular it even spawned a spin-off TV show — an occurrence about as frequent as an undisputed Ukrainian election.

Vampire: The Masquerade — Bloodlines continues the trend, and it's nice to find that the developer, Troika, is prepared to treat its customers as adults. The opening scenes of the game show you getting a little crazy with an anonymous companion. The condoms are on the bedside table, the wine is flowing, and then... bam! Instead of the happy ending you'd been hoping for, you come to later and find yourself one of the undead.

Bloodlines has some big guns up its sleeve, not least the ultra-immersive Vampire: The Masquerade world, which places as much emphasis on the gritty city streets as it does on horror-style aspects. It's also got the much-vaunted Source Engine powering its visuals, and the same polygon pusher utilised by Half-Life 2 is put to menacingly good effect here, albeit with noticeably less detail.

Where Bloodlines goes astray is in merging its role-playing elements with combat. Fighting hand-to-hand and using vampire powers necessitate getting close in to your foes, and the camera angles and visual effects do you no favours here. Control feels imprecise, and when fighting multiple attackers, you never get the impression that you're fully in command of the situation. You're frequently required to engage in combat, even if you're playing some of the more retiring vampire clans, which only compounds the problem.

Less aggressive interaction with other beings is handled very well. If you're playing a vampire with a persuasive bent, you can exercise those powers frequently and effectively in a far superior manner to the fighting modes. It's a shame there isn't even more of this type of action.

There's no multiplayer option, but this hasn't prevented Bloodlines from having its share of glitches, either — graphic irregularities and play faults shouldn't be this prevalent in any game, let alone one with a dedicated single-player focus. Chalk one up against Troika for not doing more with the extra time.

With seven different types of vampires to play and multiple ways to complete the game, if you're willing to take it on faith that the minor issues will be rectified post-release (and the shaky combat isn't too much of a deterrent), then Bloodlines has potential. But a little more time could have made Vampire: The Masquerade — Bloodlines a whole lot better.

The lowdown

▲Upsides: the Vampire world is full of depth and character.

▼Downsides: combat model is a mess; game has a rushed feel.

Details

Contact	Activision
Online	www.vampirebloodlines.com
Price	$89.95
Verdict	★★★★☆

The Lord of the Rings: The Battle for Middle-earth

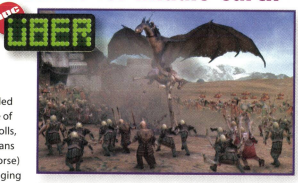
Never one to let a horse die without giving it a sound flogging, EA spins another majestic title out of *The Lord of the Rings* franchise.

The Battle for Middle-earth knows which side its bread is buttered on. You get lashings of video from *The Lord of the Rings* movies and many (though not all) of the original actors' voices. What's more, it's all fronted by the latest version of EA's Siege engine, which debuted in their Command & Conquer: Generals game. And it looks marvellous.

Right from the start, you're in for a thrill. The game's strategic map is a living, breathing, animated treat for *LOTR* fans. Even if you're not a gamer, you can piece together the events of the book/movie in your head using this. It's lush.

The action is just as good. The gameplay revolves around capturing strategic locations (to yield more resource points) and killing enemy units (to gain experience points). In time, your units grow in stature and become more powerful; even your structures can gain in potency the more you use them. EA has done a sterling job in streamlining the whole technology tree aspect — old hands may think decisions like designating set locations for buildings is a bit limiting, but the benefits are soon apparent — it's simply more efficient, allowing players to focus on combat.

And the fighting — courtesy of some detailed units with an effective use of scale — looks amazing. Trolls, the Nazgul, Orcs and humans never looked better (or worse) and Gandalf is a staff-swinging revelation with his dynamically lit boomstick causing mega damage on the battlefield.



Cheque's in the (chain) mail: *Nazgul debt collectors repossess a late-model steed.*

The only issue? It's too easy for players to cling by a fingernail until the endgame, essentially wiped out but still capable of being a pest. It's at this stage that the most powerful effects become available, and then it's a case of mopping up the remains before battling with a contender.

It's getting boring saying it every three months or so, but The Battle for Middle-earth is the latest "best RTS ever". The visuals are beyond reproach, the execution flawless and the playing experience exemplary. Battle pacing is about the only thing awry here, and it's a very minor quibble indeed.

The lowdown

▲Upsides: attention to detail; brilliant film tie-in effort.

▼Downsides: you can get bogged down into a stalemate at times.

Details

Contact	Electronic Arts
Online	www.eagames.com
Price	$89.95
Verdict	★★★★½

Men of Valor

Sometimes a script-based first-person shooter can work. The trouble is, those times are mostly in the distant past.

Dean Shepard is a black man in 1960s America. Riots, racism and the KKK are the least of his problems, however, because he's been shipped out to Vietnam. And because the Vietnam he's been sent to is the one depicted by 2015 Studios, he's guaranteed not to enjoy the ride.

At least in the real Vietnam you could run off into the bush, get hold of some wacky baccy and generally go a bit nutso. Here, your destiny has been carefully mapped out for you, right down to the last plot twist, via a very linear storyline. You may be in the driver's seat, but somebody else does the steering. It's a formula that's aged rapidly, and one best implemented on consoles. On PC it comes across as highly limiting, especially considering the wealth of realism-based wartime FPSes available.

Men of Valor just doesn't stand out. Sure, the environments (rendered via the Unreal engine) make it probably the first Vietnam game to really get a grip on what dense foliage is like, but let's face it, you can visit the local National Park if you want to play *Burke's Backyard*. If you want a stirring shooter experience, on the other hand, this is unlikely to satisfy — it looks polished, and comes across as a quality product, but it lacks the gut factor.



Apocalypso Now: *the Christmas cruise down the Mekong was a subdued affair.*



Home advantage: *irate NBA fans decide that throwing cups of beer no longer cuts it.*

And like most similar games, the AI is thicker than Oprah in a Sumo suit because all the enemies are meant to do is pop up, then shoot. It's simply a matter of finding the trigger point that sets off the action and being prepared once the rice hits the fan — fun for half an hour, and a chore thereafter.

Men of Valor isn't bad. It's just not special enough to warrant your money or time, especially given all the gaming excellence raining down on PCs recently. Whether you prefer single or multiplayer, there's better material out there.

The lowdown

▲Upsides: welcome to the (highly realistic) jungle.

▼Downsides: heavily scripted action just doesn't stick well on PC.

Details

Contact	Vivendi Universal
Online	www.menofvalorgame.com
Price	$69.95
Verdict	★★★☆☆

QUOTE OF THE MONTH

Bill Gates couldn't get his slideshow running at January's CES in Las Vegas, but that wasn't the most entertaining presentation he gave that week. In a stunning interview with CNET, Mr Gates brushed off his **Cold War** thermal undies, describing IP law reformists as "some new modern-day sort of **communists**". Right on, comrade!



LOOPY FOR LAWSUITS

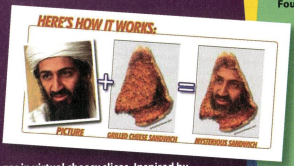
Apple has launched a wave of lawsuits to track down the source of leaked product information from within the company, while also going after owners of Web sites publishing reviews on pre-release **OS 10** code. This gnashing of teeth is becoming common, with companies like **Microsoft** and **SCO** amassing enormous legal bills in bids to protect or profit from IP. Heck, nobody would be talking about SCO if it wasn't for the Linux suit.

Californian **Thomas Slattery** has decided to stand up to the Sunnyvale legal eagles by filing a suit and seeking damages over the **iTunes** and **iPod** relationship. iTunes can only be used to download songs onto an iPod and Slattery claims he was "forced to purchase an Apple iPod" because of his desire to use the service. Perhaps Slattery hasn't heard of the myriad other sites that can be used to legally download MP3s.

Just because Apple has an 87% share of the hard disk based MP3 player market doesn't mean that the iPod is the only MP3 player out there. Hey Thomas, if you don't like the way Apple does things, you're free to shop elsewhere.

WHERE'S THE CHEESE?

One of the weirder experiences you can have working at *APC* is browsing through the Chip chat inbox — which is why we didn't blink an eye when we stumbled across this: the world's first Web-based cheese sandwich generator, which embeds digital images in virtual cheesy slices. Inspired by an eBay auction of a grilled cheese sandwich claimed to bear an imprint of the likeness of the Virgin Mary, someone has devoted a Web site to the cult of cheesy images. Browse your hard drive for a suitable image, click upload, and gaze in awe as a server somewhere devotes real, actual clock cycles to processing it. Go to *www.goldenpalace.com/grilledcheese/welcome.php*.



A GLITCH IN ACCOUNTING

Four Microsoft staffers are in hot water over US$32.4 million worth of software bought at staff discount which they then on-sold at retail prices. They're accused of selling multiple copies of SQL Enterprise Server 7.0, which is worth US$29,000 a pop. We wonder how Microsoft could have missed the fact that four staff members bought US$32 million worth of software for home use only — but it turns out there are certain advantages in working for the world's largest software company. The employees simply altered the programming code that alerts Microsoft managers to staff purchases. Now that's innovation in the workplace.

LONG WAIT FOR LONGHORN

Here are your suggestions for how Microsoft CEO Steve Ballmer and co. can release Longhorn (the next version of Windows) by December 31, 2006:

1 Did Ballmer even mention a year?
2 Install fingerprint readers in Redmond — those logon times are a b#%ch.
3 End compulsory Bill-appreciation staff workshops.
4 Re-re-re-re-re package Windows for workstations (aka NT).
5 Two words: "outsource", and "India".

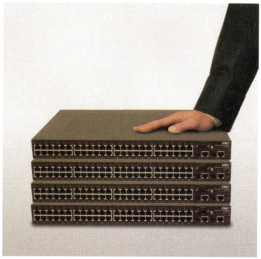
Thanks to: Luke Toland, John Attwood, Tim Black and Aaron Bond.



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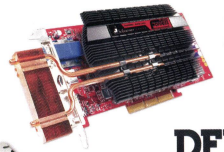
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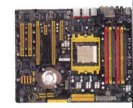
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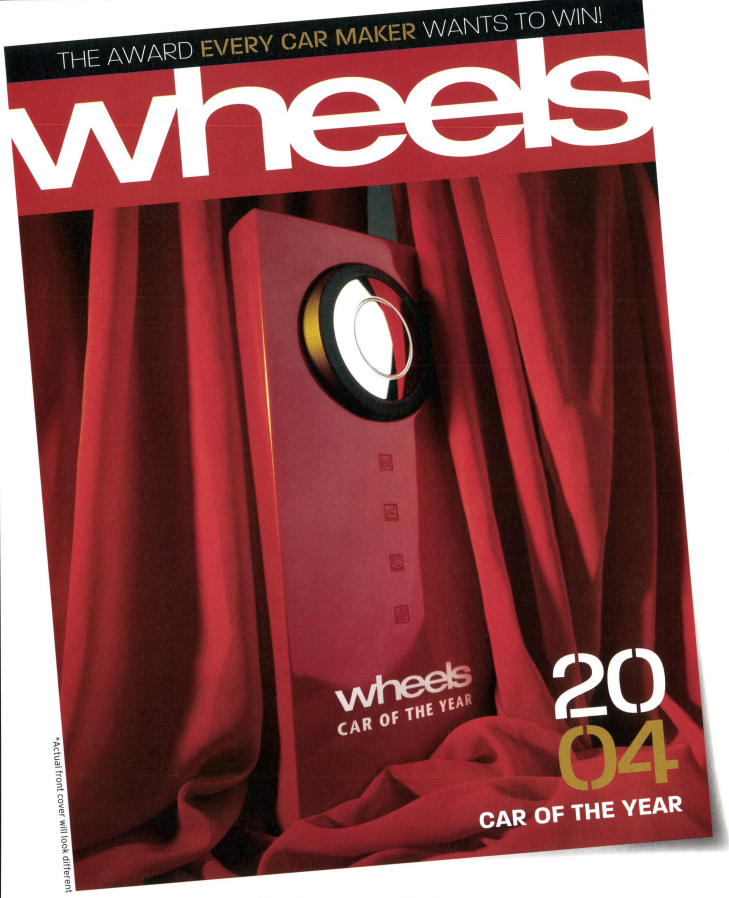
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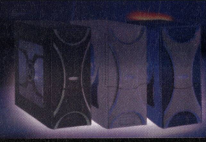
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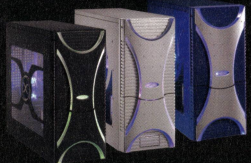


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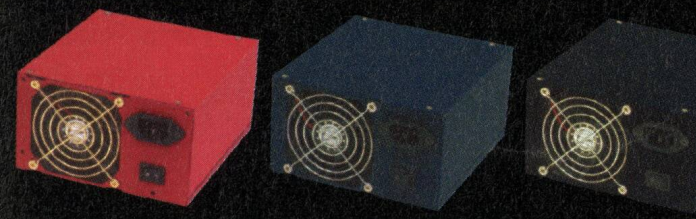
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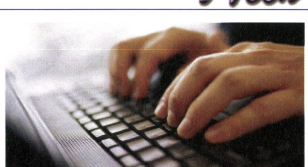
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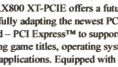


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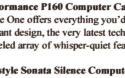
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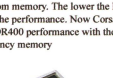
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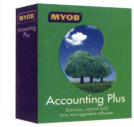
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MYOB	
FileMaker	
Adobe	
Symantec	5
Corel	
Microsoft	6

Sales Enquiries 1300 13 9999 **Fax** 1300 13 66

General Enquiries 1300 13 5555 **Web** ht.com

For specialised Government & Education pricing & services contact

Government 1300 72 9010 **Education** 1300 72 90

bankcard MasterCard VISA efpos Diners Club International AMERICAN EXPRESS RENTSMART FINANCE METH ARE SUBJECT APPROVAL.

Harris Technology Pty Ltd ABN 74-007-870-484
A member of the Coles Myer Ltd. group

TEST OFFER FROM RENTSMART

ENTSMART $2,000 OR MORE ROM HARRIS TECHNOLOGY URING FEBRUARY 2005 AND ECEIVE A BONUS CANON IGITAL CAMERA*



PRODUCT (P6546) FEATURES:

CANON POWERSHOT A400

Affordable, class leading features and style.

- 3.2 Megapixel
- Retractable Canon 2.2x optical zoom lens
- Movie recording and playback with sound.
- DiG!C Imaging processor delivers superior digital photos
- Print/Share button allows easy 'one push' printing and downloading of images

OW AVAILABLE FOR NEW BUSINESSES!

Smart is now available to brand new businesses regardless of their time trading. New businesses can take ntage of the convenience and flexibility renting has to offer and get all the technology and office equipment need straight away.

RMS AND CONDITIONS OF RENTSMART OFFER

Offer is available to approved customers who RentSmart $2,000 or more worth of business equipment at s Technology from 01-02-2005 until 28-02-2005. Depending on the delivery method you have chosen, the n PowerShot A400 digital camera will be available for collection from your chosen Harris Technology store ghted to you upon approval and receipt of RentSmart equipment. Limit of one Canon A400 Digital Camera ualifying promotional customer. Not to be used in conjunction with any other RentSmart offer. Standard Smart terms and conditions apply. RentSmart is a rental facility operated by RentSmart Pty Ltd. 073 225 457.

be 100% Tax Deductible if used solely for business. See your accountant or tax advisor for personal tax advice.

6 GREAT REASONS TO RENTSMART

ALWAYS HAVE THE LATEST EQUIPMENT
RentSmart enables you to update to the latest equipment as your needs change or your equipment outdates.

SAVE YOUR MONEY
There are no deposits or upfront payments. So with RentSmart you can keep your money working for you in more profitable ways.

TAX DEDUCTIBLE^
If you are using your equipment for business purposes, your rental payments can be fully tax deductible.

GET EVERYTHING YOU WANT TODAY
RentSmart gives you greater flexibility for your technology needs. Why not bundle together a wide range of office equipment, computer software and furniture all into one convenient plan?

FAST IN STORE APPROVAL
You can be approved to RentSmart up to $20,000 of equipment in just minutes whether you're in store or at your office.

AFFORDABLE MONTHLY REPAYMENTS
Choose from a 2, 3 or 4 year rental plan to spread the cost of your equipment over its useful life.

PLEASE NOTE:
All purchases subject to terms & conditions and returns policy. Delivery charges may apply. Not all items stocked in store but available for pick-up/delivery.

SONY

VAIO NOTEBOOKS

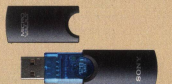
MICROVAULT

USB 2.0 PORTABLE STORAGE DEVICE

Software Bundle enables you to:



ELITE SERIES



N1310	128MB	$60
N1311	256MB	$86
N1312	512MB	$169

CARRY POUCH FOR S SERIES

P7257 **$89**

VAIO CORPORATE NOTEBOOK BAG (UP TO 15")

N9086 **$159**

VAIO AC ADAPTOR FOR B/T/S SERIES

Q4964 **$189**

EXTENDED BATTERY FOR B SERIES (UP TO 13HRS)

Rent* $9.51/wk

I0314 **$849**

*RENTSMART

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PLEASE NOTE:

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VGNB55G

- Pentium-M 715 1.5GHz
- 14.1" XGA LCD
- 256MB RAM
- 40GB HDD#
- DVD/CD-RW Combo Drive
- Wireless LAN 802.11b/g
- Weighs 2.3kg
- **Windows XP Home**

BONUS BUNDLED VAIO BAG

HOT PRICE!



Rent* $22.40/wk

Q3573 **$1,999**

VGNB88GP

- Pentium-M 715 1.5GHz
- 14.1" SXGA LCD
- 512MB RAM
- 40GB HDD#
- DVD±RW drive
- Wireless LAN 802.11b/g
- Weighs 2.3kg
- **Windows XP Professional**

BONUS BUNDLED VAIO BAG



Rent* $25.84

Q3574 **$2,49**

15.4" WIDESCREEN LCD WITH DVD+R DUAL LAYER BUILT-IN



VGNA29GPS

- Pentium-M 725 1.6GHz
- 15.4" WXGA LCD with clear bright & dual lamp
- 512MB RAM
- 60GB HDD#
- 64MB Video RAM
- DVD±RW (supporting DVD+R double layer discs)
- Wireless LAN 802.11b/g
- **Windows XP Professional**

Rent* $34.72/wk

Q3181 **$3,499**



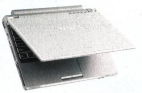
PCGK86P

- Mobile P4 538 3.2GHz
- 15.4" WXGA LCD with clear bright technology
- 2 x 256MB RAM
- 60GB HDD#
- 64MB Video RAM
- DVD±RW drive (supporting DVD+R double layer d
- Wireless LAN 802.11b/g
- **Windows XP Professional**

Rent* $30.76

Q3179 **$2,99**

SLEEK, LIGHTWEIGHT WITH WIDESCREEN LCD FOR THE MOBILE PROFESSIONAL



VGNT17GPS

- Pentium-M 733 1.1GHz ULV
- 10.6" LCD with clear bright technology
- 512MB RAM
- 40GB HDD#
- DVD±RW drive
- Wireless LAN 802.11b/g
- Weighs only 1.4kg
- **Windows XP Professional**

Rent* $39.43/wk

Q3184 **$3,999**



VGNS28GP

- Pentium-M 725 1.6GHz
- 13.3" WXGA LCD with clear bright technology
- 512MB RAM
- 60GB HDD#
- 64MB Video RAM
- DVD±RW drive
- Wireless LAN 802.11b/g
- **Windows XP Professional**

Rent* $39.43

Q3183 **$3,99**

#Accessible capacity of hard drive may be less due to pre-installed software and recovery partition. Up to 5GB u for recovery partition may be unavailable. Recovery discs not included with some brands of notebooks and desk

ECRA A3 & S1 SERIES

ECRA A3
SHIBA'S NEW TECRA A3 NOTEBOOK



uring the latest Mobile Intel Pentium M or Intel Celeron M processors and with ndard battery life of up to 4 hours, all models in the series deliver high levels rformance and reliability. Helping to maximise productivity is the full range of nsion and connectivity features including a PC Card slot, three USB 2.0 ports, ternational V.90 modem and a 10/100 Mbit Ethernet LAN port. **Optional Port dicator for the A3 Tecra notebook range available.**

CRA	A3	A3	A3
OCESSOR	Cel-M 360 1.4GHz	Cel-M 370 1.5GHz	P-M 730 1.6GHz
M STD	256MB	512MB	512MB
RD DRIVE*	40GB*	40GB*	60GB*
REEN	15" XGA TFT	15" XGA TFT	15" XGA TFT (CSV)
TICAL DRIVE	DVD/CD-RW	DVD-SuperMulti	DVD-SuperMulti
V.90 & 10/100 LAN	Yes	Yes	Yes
RELESS LAN	WiFi Antenna	WiFi a/b/g	WiFi a/b/g
RRANTY	1 year	1 year	1 year
SYSTEM	XP Pro	XP Pro	XP Pro
NT*	$19.71/wk	$23.41/wk	$27.28/wk
RT NUMBER	R0315	R0212	Q9055
CE	$1,759	$2,089	$2,639

ECRA S1



Toshiba Tecra S1 delivers outstanding performance and seamless wireless ectivity to business computing. Now free to perform at their best wherever hess takes them, executives will appreciate the added mobile productivity e Tecra S1 with up to 4.5 hours of battery life. **Includes modem and LAN abilities.**

CRA	S1	S1	S1	S1
BILE PENTIUM M	715 1.5GHz	725 1.6GHz	1.7GHz	735 1.7GHz
M STD	512MB	512MB	512MB	512MB
RD DRIVE	40GB*	60GB* (7200rpm)	80GB*	80GB*
REEN	15" XGA TFT	15" SXGA+ TFT	15" UXGA TFT	15" UXGA TFT
EO RAM	32MB	32MB	32MB	32MB
TICAL DRIVE	DVD Super Multi	DVD Super Multi	DVD Super Multi	DVD Super Multi
RELESS LAN	WiFi g	WiFi g & BT	WiFi g	WiFi g & BT
RRANTY	1 year	1 year	1 year	1 year
SYSTEM	XP Pro	XP Pro	XP Pro	XP Pro
NT*	$28.67/wk	$33.73/wk	$36.72/wk	$40.71/wk
RT NUMBER	P9081	P6963	N6410	P9082
ICE	$2,795	$3,399	$3,599	$4,129

essible capacity of hard drive may be less due to pre-installed software and recovery partition. Up to 5GB used ecovery partition may be unavailable. Recovery discs not included with some brands of notebooks and desktops.



SATELLITE P30



- Mobile Intel Pentium 4 538 with HT technology (3.2GHz)
- 17" WXGA TFT
- 80GB (5400rpm)*
- DVD SuperMulti (DVD±RW DVD-RAM)
- ATI mobility radeon 9700 with 64MB RAM
- 56K modem & LAN, WiFi a/g
- 3 x USB 2.0 & 5-in-1 reader
- CD play buttons
- Windows XP Professional

Q3620 — Rent* $38.20/wk — **$3,849**

SD MEMORY CARDS



K0510	128MB	**$47**
H9139	256MB	**$84**
M5838	512MB	**$169**

***RENTSMART**
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PLEASE NOTE:
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TOSHIBA

TECRA M2 SERIES



MY BACKUP SOLUTION



Order any Toshiba notebook with the Data protection bundle (includes Toshiba 5GB Type II ATA PC Card HDD and Iomega's Instant Automatic Backup software)

High capacity backup on the go:

- A reliable, large backup solution requires no cables, so no clutter.
- The 5GB PC Card will hold the equivalent of 3,500 floppy disks or more than 7 CDs with enough storage capacity for 5 hours of MPEG-2 DVD quality video or over 1000 MP3 music files.
- Simple plug and play functionality for simple synchronisation.

P6621 **$399**

^Limited Stock: Offer available until 28/02/05 or while stocks last. Not available with any other offer.
+These models have Intel Centrino technology.
#Accessible capacity of hard drive may be less due to pre-installed software and recovery partition. Up to 5GB used for recovery partition may be unavailable. Recovery discs not included with some brands of notebooks and desktops.

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Delivery charges may apply.
Not all items stocked in store but available for pick-up/delivery.

TECRA M2 BUNDLE^

The Tecra M2 delivers a balance of portability, hardware and image stability plus high performance. The new thin and light design features include a magnesium alloy chassis to provide added durability whilst making it the lightest in its class. Combined with extended battery life of up to 11 hours (with optional internal SelectBay battery), this makes the Tecra M2 the ideal road ready business notebook. Featuring Intel Pentium M Processors, a DVD SuperMulti optical disk drive, 3D graphics and Gigabit Ethernet, Firewire, 802.11 wireless and bluetooth. These features provide a foundation to significantly boost business productivity and choice of connectivity.

BONUS BUNDL
- Notebook Bag
- Extra 256MB RAM (not insta

Offer available until 28/02/ or while stocks last. Not available with any other offer.



Microsoft Windows xp Professional

intel centrino MOBILE TECHNOLOGY

- Intel Pentium-M 735 1.7GHz
- 2MB L2 Cache
- 512MB DDR RAM (2GB Max)
- 80GB hard drive# (5400 rpm)
- 14.1" XGA TFT Display
- 64MB Video RAM
- DVD Super Multi Drive
- 56k V.92 Modem
- Gigabit Ethernet, WiFi 802.11
- Bluetooth
- Microsoft Windows XP Professional
- 1 Year Warranty

Rent* $30.76

Q2098 BUNDLE: TECRA M2, BAG, EXTRA 256MB RAM **$2,99**

TECRA M2

The Tecra M2 series is the ideal mobile computing platform for business. Boasting high level business performance features, extended freedom to roam wherever you are required to work and versatile expansion providing room to grow. These features combine in a robust magnesium alloy chassis to protect your investment and extend product life. The Tecra M2 is easy to deploy and manage through a scalable technology platform with long life cycles reducing the cost of ownership. **Tecra M2s weigh from 2.26kg and include modem and LAN capabilities**.



MODEL	TECRA M2^	TECRA M2+	TECRA M2+	TECRA M
MOBILE PENTIUM M	1.5GHz	725 1.6GHz	735 1.7GHz	745 1.8
RAM STD	512MB	512MB	512MB	512
HARD DRIVE	40GB#	40GB#	60GB#	80
SCREEN	14" XGA TFT	14" XGA TFT	14" XGA TFT	14" XGA
VIDEO RAM	64MB	64MB	64MB	64
OPTICAL DRIVE	DVD/CD-RW	DVD Super Multi	DVD Super Multi	DVD Super M
WIRELESS LAN	WiFi Antenna	WiFi g	WiFi g	Wi
WARRANTY	3 year	1 year	1 year	1 y
OP SYSTEM	XP Pro	XP Pro	XP Pro	XP
RENT*	$26.36/wk	$30.45/wk	$32.71/wk	$38.2
PART NUMBER	R0449	R0282	Q4068	Q4
PRICE	$2,549	$2,969	$3,189	$3,84

ORTÉGÉ SERIES

ORTÉGÉ M100

IPACT, LIGHT WITH 3 YEAR WARRANTY

dy to work when and where you are, the Portégé M100 delivers an advanced combination of ultra-portability expansion capability. These functions combine to ensure your investment is well protected. Forged in nesium, the Portégé M100 portrays success while delivering absolute reliability – just the qualities you require rform brilliantly on the road and in the mobile world.

HOT PRICE



Microsoft® Windows® xp Professional

intel inside centrino MOBILE TECHNOLOGY

- Intel Pentium-M 1.2GHz Low Voltage
- 1MB L2 cache
- 256MB DDR RAM
- 60GB hard drive#
- 12.1" XGA TFT display
- Limited stock: Not available in conjunction with any other offer on this product.
- DVD/CD-RW Combo Drive
- 56k V.92 Modem
- Fast Ethernet, WiFi 802.11b
- Microsoft Windows XP Professional
- 3 Year Warranty

Rent* $33.84/wk

453 **$3,299**

RTÉGÉ SERIES

intel inside centrino MOBILE TECHNOLOGY



*These three models have Intel® Centrino technology

RTÉGÉ	R100*	M200 TABLET *	M100*
BILE PENTIUM M	1.1GHz	725 1.6GHz	1.4GHz
M STD	2 x 256MB	512MB	512MB
RD DRIVE	40GB#	80GB#	80GB#
REEN	12.1" XGA	12.1" SXGA+	12.1" XGA
V.90 & 10/100 LAN	Yes	Yes	Yes
ELESS LAN	WiFi g	WiFi g & BT	WiFi g & BT
TICAL DRIVE	No	No	DVD/CD-RW
GHT	From 1.1kg	2.1kg	From 1.8kg
SYSTEM	XP Pro	XP Tablet	XP Pro
NT*	$39.39/wk	$44.32/wk	$39.04/wk
RT NUMBER	P3052	Q9507	R1307
CE	$3,995	$4,495	$3,960

ssible capacity of hard drive may be less due to pre-installed software and recovery partition. Up to 5GB used covery partition may be unavailable. Recovery discs not included with some brands of notebooks and desktops.



TOSHIBA DLP PROJECTORS

Designed with simplicity in mind, a Toshiba projector is a lightweight, compact solution that is quick and easy to setup so that you can take it with you anywhere, anytime. And as the leading brand in mobile computers where reliability is paramount, you can trust the superior design and engineering of a Toshiba projector to last for you in the long run.

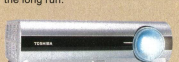


Image for illustration purposes only

- Excellent brightness
- Quiet operation
- 2 year warranty with 3 month hot swap

MODEL	S20	T90
ANSI	1400	2200
WEIGHT	3.0Kg	2.8Kg
RES	SVGA	XGA
RENT*	$19.04/wk	$33.53/wk
PART	P0226	P0228
PRICE	$1,699	$3,379

***RENTSMART**

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acer

ACER NOTEBOOKS

ACCESSORIES

TRAVELSURE CARRY CASE

M0838 **$49**

USB OPTICAL MOUSE
Silver USB mini optical with scroll wheel

L1831 **$35**

EXTERNAL USB 1.44MB FLOPPY DISK DRIVE

L1793 **$179**

ADDITIONAL BATTERY
for TravelMate 2303

R1647 **$300**

AC ADAPTOR + POWER CORD
for 2000 and 2500 Series

P3285 **$137**

AC ADAPTOR + POWER CORD
for 4000 Series

Q3818 **$137**

TARGUS USB 2.0 MOBILE PORT STATION

N0426 **$249**

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TRAVELMATE 2303LMi

The TravelMate 2300 is the perfect partner for enhancing your efficiency and success with its combination of robust processing power, graphics capabilities, communications and dependable design.

- Intel Celeron-M 340 1.5GHz
- 256MB RAM
- 40GB hard drive#
- DVD±RW Drive
- 15" XGA TFT up to 64MB Shared Video Memory
- Built in 56Kbps fax/modem + 10/100 Ethernet
- 802.11g WiFi (Signal Up Technology)
- Lithium-Ion battery up to 5 hours life
- 3 x USB 2.0 ports
- 1 x Type II PCMCIA
- Weighs 2.9kg
- **Windows XP Professional**



intel inside celeron

Microsoft Windows XP Professional

Rent* $20.16

Q6572 **$1,79**

TRAVELMATE 4050LMi

The TravelMate 4050 is well balanced to optimise your productivity and amplify your success, combining solid performance with wide ranging functionality

- Intel Pentium-M 710 1.4GHz
- Intel Centrino mobile technology
- 256MB DDR SDRAM
- 40GB hard drive#
- DVD±RW drive
- 15" XGA TFT up to 64MB Shared Video Memory
- Built in 56Kbps fax/modem + 10/100 LAN
- 802.11g WiFi (Signal Up Technology)
- Lithium-Ion battery up to 5.5 hours life
- Infra-red, Firewire, S-Video ports
- 3 x USB 2.0 ports
- 1 x Type II PCMCIA
- Weighs 2.84kg
- **Windows XP Professional**



intel inside centrino MOBILE TECHNOLOGY

Microsoft Windows XP Professional

Rent* $24.08

Q6760 **$2,14**

ACER'S 2 HOUR COMMITMENT WARRANTY EXPRESS SERVICE GUARANTEES THAT YOU'LL NEVER BE KEPT WAITING AGAIN

1 year return to base with 2 hour Express Service. 2 hour repair turnaround available in Brisbane, Sydney Melbourne, Perth, Canberra, Adelaide, Hobart, Auckland, Christchurch & Wellington.

#Accessible capacity of hard drive may be less due to pre-installed software and recovery partition. Up to 5GB u for recovery partition may be unavailable. Recovery discs not included with some brands of notebooks and desk

GH PERFORMANCE COMPUTING AT AN AFFORDABLE PRICE

CER POWER F1 MICROTOWER SERIES

REE GOOD REASONS TO CHOOSE THE ACERPOWER F1:

Uncomplicated and to the point, designed for users who value a straightforward computer delivering the latest processing power and the ability to handle complex business tasks efficiently.

The latest in proven technology combined with Acer's high-level reliability gives users a dependable and cost-effective configuration that both simplifies management and lifts office productivity.

Offers multiple means to upgrade and expand functionality, ensuring businesses make the most of their investment.



tium 4 2.8Ghz 533Mhz
MB PC2700 DDR-SDRAM
B EIDE hard drive (7200 RPM)#
Write, 24X ReWrite 52X Read CDRW
udes keyboard (USB)
udes optical mouse
utton including wheel)
rosoft Windows XP Professional
ar onsite desktop warranty^

Rent* $12.31/wk

478 **$1,099**



- Intel Pentium 4 3.0GHz with HT Technology
- 512 MB PC2700 DDR-SDRAM
- 80GB EIDE hard drive (7200 RPM)#
- Ultra AGP II integrated VGA
- DVD Burner (16X DVD Dual layer)
- 1.44MB floppy drive
- Integrated 10/100 LAN
- Acer USB multimedia keyboard
- Acer USB optical mouse (3 buttons including wheel)
- Microsoft Windows XP Professional
- 1 year onsite desktop warranty^

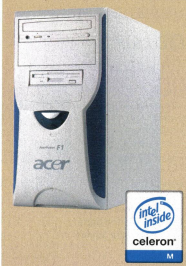
Rent* $14.56/wk

R1938 **$1,299**

site warranty coverage is limited to within a 80km radius of an Acer Onsite Service Provider location.

ssible capacity of hard drive may be less due to pre-installed software and recovery partition. Up to 5GB used covery partition may be unavailable. Recovery discs not included with some brands of notebooks and desktops.

ACER POWER F1 MICROTOWER SERIES



- Intel Celeron 2.8GHz (533 MHz front side bus)
- 256MB PC2700 DDR-SDRAM
- 40GB EIDE hard drive (7200 RPM)#
- Ultra AGP II integrated VGA
- 52X CD-ROM drive
- 1.44MB floppy drive
- Integrated 10/100 LAN
- Integrated 16 bit AC655 stereo sound
- Acer USB multimedia keyboard
- Acer USB optical mouse (3 buttons including wheel)
- Microsoft Windows XP Home
- 1 year onsite desktop warranty^

Rent* $7.83/wk

Q3389 **$699**

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COMMUNICATION

NEW O2 Xda SERIES

XDA II MINI

Bluetooth



- Intel Xscale 416MHz
- 64MB RAM, 64MB ROM
- Tri-band 900/1800/1900
- 65K Colour LCD
- MMC / SDIO expansion slot
- Bluetooth
- 1.3 Megapixel camera
- IrDA / USB 1.1
- 105 x 58 x 17.6 mm
- Windows Mobile 2003

Shrink an Xda II, add a 1.3 megapixel camera and free 256MB SD card and you have a Pocket PC to suit all walks of life! With Microsoft Windows Mobile 2003 2nd Edition for Pocket PCs, you can e-mail, MMS, SMS, access contacts, calendar, make phone calls, surf the web & access well known Microsoft applications in either landscape or portrait view.

Rent* $12.31/wk

Q5532 **$1,099**

XDA IIS

Bluetooth



- Intel Xscale 400MHz
- 128MB RAM, 96MB ROM
- Quad-band 850/900/1800/1900
- 65K Colour (240 x 320) LCD
- IrDA / USB 1.1
- MMC / SDIO expansion slot
- Bluetooth
- Integrated 802.11b WLAN
- Colour VGA Camera

Sleek, elegant and lightweight, with heavy duty performance. Windows Mobile 2003 2nd Edition for Pocket PC lets you e-mail, MMS, SMS, access contacts, calendar, make phone calls, surf the web & access well known Microsoft applications in either landscape or portrait view.

Rent* $16.80/

Q5533 **$1,49**

O2 XPHONE II GSM SMART PHONE

Bluetooth



- TI OMAP 730 200Mhz
- 32MB RAM, 64MB ROM
- Tri-band 900/1800/1900
- 65k Colour (176 x 220) LCD
- Mini SD memory card slot
- Mini USB
- Bluetooth
- VGA camera
- 940mAh Li-Ion battery
- 107.5 x 44.5 x 18 mm

Rent* $7.83/wk

Q5531 **$699**

FOR BUSINESSES ON THE MOVE

palmOne Zire 72

TAKE PICTURES. CAPTURE VIDEO. SHARE LIFE.

Bluetooth

BONUS HARDCASE[1]



N5802 **$429**

***RENTSMART**

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TUNGSTEN T5

Bluetooth

BONUS BUNDLE[2]
- CRADLE KIT
- LEATHER CASE



The handheld that's also an USB drive & MP3 player

- 256MB of storage (215MB actual storage capacity: 160MB internal flash drive; 55MB program memory for applications and data.)
- SDIO & MMC expansion slot
- Large 320 x 480 TFT 65,000 colour display with landscape & portrait modes
- Palm OS 5.4

Rent* $7.83/wk

Q9808 **$699**

Treo 600

BONUS OFFER[3]
BONUS PALMONE M500 PDA



GSM/GPRS quad-band Smartphone

- Full featured mobile phone and Palm Powered™ organiser
- 32MB (24MB available) memory; SDIO/MMC
- Bright colour backlit display
- Built-in VGA camera
- Palm OS 5.2

Rent* $9.51

L8676 **$84**

TERMS & CONDITIONS

All offers valid until 28/02/05 or while stocks last. Offers not available in conjunction with any other offers on th products. [1]Receive a bonus hardcase via redemption from palmOne Australia. [2]Receive a bonus cradle kit & leather case bundle. [3]Receive a bonus palmOne M500 PDA.

ORDLESS AND OPTICAL COMBINATIONS

TEBOOK OPTICAL MOUSE PLUS



plify your mobile life. The Logitech® Notebook ical Mouse Plus goes where you go, with built-in d management for easy packing, all-terrain optical king for maximum surface coverage and shock-stant bodywork to withstand bumps on the road. perfect balance of comfort and mobility.

740 **$45**

900 BLUETOOTH TICAL MOUSE



and your wireless freedom – and make your PC tooth® with this stylish cordless optical mouse. tech's MX™ Optical Engine responds instantly ur every movement. The base is both Bluetooth ess hub and mouse charger. With a rapid charging am, your mouse is always ready for work (or play).

331 **$145**

OVO CORDLESS DESKTOP



Logitech® diNovo™ Cordless Desktop® for books is the first complete desktop solution otebook PCs. At your desk enjoy a trim, ultra- eyboard, an advanced cordless mouse, and a rate numeric pad. The wireless mini-receiver plugs tly into the USB port for a complete cordless and le solution. Handy USB desktop stand for more enience at your desk.

216 **$230**

CORDLESS OPTICAL MOUSE FOR NOTEBOOKS - SILVER



Logitech's Cordless Optical Mouse for Notebooks delivers mobility without compromise. Using a trim USB receiver, you get crisp cordless performance through Logitech's FastRF technology. Crafted to match with today's notebook PCs, it can be used with either right or left hand. An on-off switch conserves power on the road. Also available in black.

L6280 **$59**

MX 1000 CORDLESS LASER MOUSE



Experience the world's 1st laser mouse. The Logitech® MX™ 1000 Laser Cordless Mouse delivers 20x the tracking power of standard optical mice, tracking precisely on surfaces where LED-based optical mice tend to falter. Maximise your performance with the most advanced navigation and power management features available.

P3351 **$145**

CORDLESS DESKTOP LX 700



The Logitech® Cordless Desktop® LX 700 is a premium blend of form and function, with rechargeable cordless optical mouse. MediaLife™ software presents your media library in a single easily navigated interface. Includes sleek, one-touch controls for media, communication and other frequent applications. Plus keyboard-based navigation controls that complement mouse.

P3354 **$149**

QUICKCAM IM



QuickCam IM includes a bonus headset for private conversations and a bonus clip for notebooks & flat panel monitors. Capture videos and photos and e-mail them in one simple click.

N9485 **$89**

QUICKCAM PRO 4000



Capture high-quality videos and megapixel photos. The built-in-mic makes it easier to chat with live audio and video.

F8835 **$175**

INTERNET CHAT HEADSET



Perfect for internet chat, multi-player gaming or music listening, Logitech's Internet Chat Headset has a noise-cancelling microphone to block out background noise and four interchangeable, coloured covers.

H8683 **$37**

STEREO USB HEADSET



Advanced digital USB technology provides superior audio quality and simple plug and play operation. The noise-canceling microphone filters out unwanted background noise. The headphone features comfortable leatherette ear pads.

H8688 **$65**

PLEASE NOTE:
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TARGUS®

Making Your Mobile Life Easier®

GET MOBILE... GET TARGUS

HUBS

USB 2.0 SLIM 4-PORT POCKET HUB



P0397 **$65**

USB 2.0 HIGH SPEED 7-PORT HUB



P0396 **$69**

USB 2.0 ULTRA MINI 4-PORT HUB



P0398 **$39**

USB 1.1 MICRO SWIVEL 4-PORT HUB



Compact and lightweight USB 1.1 Hub comes with a swivelling connector to allow direct plug-in connection.

H2072 **$25**

PLEASE NOTE:
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ULTIMATE PROTECTION

AIR NOTEPAC PLUS



- SafePORT section protects notebook
- Zip down workstation
- Reinforced stress points
- Non skid rubber feet

72310 **$113**

SPORTS BACKPACK



- SafePort cushions for added protection
- Convenient phone pouch
- Moulded carrying handle
- File section

J3709 **$119**

ALUMINIUM ATTACHE



- Padded interior with security st
- Two internal dividers for customising the case to the wid of your notebook
- Self-Locking Closure
- Scratch resistant panels

Q9517 **$14**

PORT REPLICATORS

MOBILE PORT STATION



Expand your notebook's capabilities! Add audio Ethernet, serial, parallel and up to five USB devices such as mice, joysticks, keyboards and more.

N0426 **$249**

USB 2.0 MOBILE PORT REPLICATOR



Ideal for home, office or on the road, this portable station provides support for both legacy (serial, parallel and PS/2) and USB 2.0 devices.

P2695 **$139**

USB PORT REPLICATOR WITH VIDEO

NEW!



- One cable solution via the USE port replicator with integrated video over USB
- Provides 4 USB Ports

R1718 **$34**

WIRELESS PRESENTERS

WIRELESS PRESENTER



- Control your presentation
- 3 tools in 1: Remote presenter, 16 directional mouse and laser pointer beam
- 10m range

H9609 **$80**

WIRELESS MULTIMEDIA PRESENTER



- 4-in-1: Trackball mouse, laser pointer, multimedia and presentation controls all in one
- 15m range
- 2.4GHz wireless technology

P5884 **$154**

WIRELESS OPTICAL PRESENTER MOUSE



- Portable 2.4GHz presenter
- Optical wireless mouse
- 15m range
- On/off switch to preserve batte life

M9225 **$10**

ELKIN ACCESSORIES

2.0 HI SPEED DRIVE CLOSURE



With its bandwidth 40 times greater than USB 1.1, Hi-Speed USB 2.0 provides the ideal storage capacity and ultra fast speeds. Simply insert a hard drive or DVD burner or CD burner and create a portable media device. Ideal for loading large files and transferring between desktop or laptop computers.

646 **$110**

2.0 4 PORT HUB



Hi-Speed USB 2.0 4-Port Hub allows you to connect 4 ultrafast devices such as next-generation ners, printers and video cameras. Small and kable, it is the ideal accessory for your desk.

731 **$69**

USB 2.0 7 PORT HUB



The latest innovation from USB leader Belkin lets you connect up to seven devices quickly and easily. Our Hi-Speed USB 2.0 7-Port Hub features two, top-loading downstream USB ports. Ideal for Bluetooth adapters, Flash Drives and RF receivers!

M3000 **$79**

ELESS KEYBOARD & OPTICAL MOUSE DLE



advantage of the latest advances in computing wireless freedom and optical precision-all in one age. The Belkin Wireless Keyboard and Optical e bundle uses digital radio technology to give you xury of using your keyboard and mouse in comfort here within six feet of the receiver.

76 **$59**

WIRELESS KEYBOARD AND OPTICAL ERGO MOUSE BUNDLE



Navigate the web at optimum speed with wireless convenience. Our Wireless Keyboard and Optical mouse bundle offers advanced input technology combined with multimedia functionality. With this finely constructed, easy to use wireless duo, you'll enjoy customisable instant access hot keys and a programmable mouse for easy scrolling and shortcuts. The powerful Optical Mouse delivers twice the accuracy of ordinary mice, and the keyboard includes a foldaway wrist rest for your comfort.

N0658 **$85**

OBOARD PRO KEYBOARD WITH 2 USB PORTS



ErgoBoard Pro provides the latest USB technology rated into an ergonomically designed keyboard built-in USB connectors to maximise desktop space nsure simplicity of use.

99 BLACK **$39**

WIRELESS OPTICAL 5 BUTTON ERGONOMIC MOUSE



The ErgoFit Wireless Optical Mouse from Belkin brings the joy of wireless freedom to your fingertips. Designed to release you from the mess of long, tangled mouse cords, it lets you enter information to your computer from up to six feet away, with smooth, digital accuracy. An exceptional fit for right-handed users, the ErgoFit gives you amazing comfort and flexibility.

K8274 **$59**

POWER PROTECTION SOLUTION

Protect your valuable equipment with Belkin's high quality surge boards. All of our surge products come with a Lifetime Warranty (which means we will replace the board every time it fails - for the rest of your life) and also a Connected Equipment Warranty (which means Belkin will replace or repair your equipment up to the value stated if it is damaged by a surge or spike while connected to our surge boards). Please see packaged warranty notice for more details.

SurgeMaster® Superior Series Surge Protector



The Superior Series is perfect for mid-level to advanced computers, inkjet printers, ADSL modems, audio video & Ethernet networks.

N3366	6 Way	**$139**
N3362	5 Way (Tel, RJ45)	**$139**
N3367	6 Way (Tel, Audio, Visual)	**$149**

SurgeMaster® Gold Series Surge Protector



The Gold Series is perfect for professional workstations, laser printers, broadband modems, home theatre & Ethernet networks.

N3353	8 Way (Tel, Audio, Visual)	**$169**
N3349	7 Way (Tel, Audio, Visual, RJ45, F-type)	**$179**
N3351	7 Way (Tel, Audio, Visual, RJ45)	**$189**

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POWER BACK-UP EQUALS POWER PROTECTION

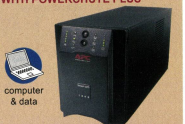
APC TRAVELPOWER CASE BACKPACK



Notebook carry case with integrated universal charging electronics.
Includes:
- APC Backpack
- TravelPower adapter
- International power plug adapters
- Airplane & Cigarette plug adapters
- Notebook adapters tips
- USB Splitter cable for powering mobile phone, PDA's etc (USB charging cable sold separately)

Q6119 **$139**

APC SMART-UPS 1000VA USB WITH POWERCHUTE PLUS



computer & data

Smart battery backup & high performance surge suppression

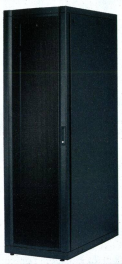
Including additional outlet for protection of printers, audible alarms, phone/modem protection and user replaceable hot swappable batteries. PowerChute® Plus software.

Rent* $14.51/wk

D9337 **$1,295**

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APC NETSHELTER VX 42U ENCLOSURE

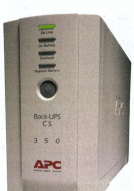
Rack enclosures with advanced cooling, power distribution, and cable management for server and networking applications in IT environments
- Optimised depth - 1070mm
- Numbered U positions
- Rear power distribution channels
- Rear cable management channels
- Guaranteed compatibility with leading manufacturers
- Ships fully assembled

Want to customise your Rack solution?
APC makes it easy with the APC Rack configurator.
Go to **www.apcc.com/sizing/selectors.cfm** and design the rack solution that is right for you.

Rent* $28.22/

E4994 **$2,72**

BACK-UPS CS FOR WORKSTATIONS





Rear view

Best Value Battery Backup & Protection for Home and Business Computers
- Battery powered & surge protected power outlets
- Built-in phone/fax/modem line (DSL compatible) protection
- Safe system shutdown software
- Sophisticated power management features
- Easy access hot-swappable, user-replaceable battery

APC BACK-UPS CS 350VA/210W 230V

C5446 **$159**

APC BACK UPS CS 650VA/400W 230V

Q7196 **$235**

SMART-UPS XL MODULAR 1500V AND 3000VA 230V RACKMOUNT/ TOWER PREMIUM UPS





Rear view

NEW! Smart-UPS XL Modular 1500VA and 3000VA 230V Rackmount/Tower Premium rack or tower extended run power protection for applications requ the higher availability of modular hot-swap compon and network manageability.

APC SMART-UPS XL MODULAR 1500VA 230V RACKMOUNT/TOWER UPS Rent* $29.23/

R1526 **$2,85**

APC SMART-UPS XL MODULAR 3000VA 230V RACKMOUNT/TOWER UPS Rent* $39.43/

R1527 **$3,99**

ECURITY, FIREWALL AND VPN APPLIANCIES

REBOX® X EDGE FAMILY





box® X Edge, model-upgradeable VPN endpoints and SOHO firewall security appliances, deliver commercial-de solutions that integrate perfectly with Firebox X to provide full, centralised management, logging, and prical reporting for securing telecommuter and remote offices. In addition, their intuitive user interfaces help ll businesses with limited security expertise secure networks effortlessly.

REBOX EDGE	Firebox® X5	Firebox® X5w	Firebox® X15	Firebox® X15w	Firebox® X50	Firebox® X50w
	WG40005	WG400060	WG40015	WG40070	WG40050	WG40080
REWALL ROUGHPUT (Mbps)	80	80	95	95	100+	100+
N THROUGHPUT ops)	35	35	35	35	35	35
NCURRENT SSIONS	6,000	6,000	8,000	8,000	10,000	10,000
ANCH OFFICE VPN NNELS	2	2	15	15	25	25
BILE USER VPN NNELS	11	11	25	25	50	50
ER LIMIT	12	12	30	30	50+	50+
NT*	$8.28/wk	$9.62/wk	$10.07/wk	$12.31/wk	$17.59/wk	$19.27/wk
RT NUMBER	P9512	R1522	P9522	R1523	P9532	R1524
CE	$739	$859	$899	$1,099	$1,570	$1,720

REBOX® X GATEWAY ANTI VIRUS FOR E-MAIL

hGuard® Gateway AntiVirus for E-mail service delivers robust e-mail protection integrated into your Firebox®X. additional layer of antivirus security delivers signature-based protection against viruses, worms, trojans and ded threats, before they enter your network. The affordable yearly subscription is priced by model, regardless w many users you need to protect.

BOX X500 1-YEAR GATEWAY ANTIVIRUS EMAIL SUBSCRIPTION

426 **$465**

FIREBOX X700 1-YEAR GATEWAY ANTIVIRUS FOR EMAIL SUBSCRIPTION

Rent* $8.46/wk

R1427 **$755**

BOX X1000 1-YEAR GATEWAY ANTIVIRUS EMAIL SUBSCRIPTION

Rent* $13.78/wk

438 **$1,230**

FIREBOX X2500 1-YEAR GATEWAY ANTIVIRUS FOR EMAIL SUBSCRIPTION

Rent* $30.66/wk

R1440 **$2,989**



Firebox® X500

WG40500

Small businesses requiring an affordable, integrated security appliance with simple operation. Perfect for 20 - 100 users.

Rent* $30.76/wk

M5787 **$2,999**

Firebox® X700

WG40700

Small businesses requiring an affordable, integrated security appliance that grows with their needs. Designed for 50 - 200 users.

Rent* $36.31/wk

M5788 **$3,659**

Firebox® X1000

WG41000

Medium businesses requiring multi-layered security solutions with centralised management. Ideal for 200 - 500 users.

Rent* $46.35/wk

M5789 **$4,899**

Firebox® X2500

WG42500

Medium or distributed enterprises requiring the utmost protection and remote connectivity. For organisations with more than 500 users.

Rent* $67.28/wk

M5791 **$7,559**

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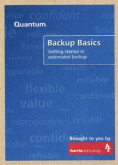
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Quantum

QUANTUM PROTECTS YOUR DATA & YOUR BUDGET!

CALL HARRIS TECHNOLOGY ON 1300 19999 FOR ASSISTANCE WITH DETERMINING THE BEST SOLUTION FOR YOUR DATA NEEDS.



DON'T FORGET TO ASK FOR YOUR BONUS COPY OF "BACKUP BASICS" COURTESY OF QUANTUM AND HARRIS TECHNOLOGY.

QUANTUM TAPE MEDIA

DLT TAPE IV
CompacTape IV (20/40,35/70&40/80GB) DLT Tape

71231 **$69**

QUANTUM SDLT1
SDLT1 Tape (110/220GB&160/320GB)

B9825 **$79**

QUANTUM SDLT2
Media for the SDLT600

N4918 **$179**

QUANTUM WARRANTY
Available for all models. 3-year rapid exchange warranty with telephone & online support. On-site installation and on-site service optional.

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Data is the most valuable asset your business owns. Without it, people sit idle, your network is inoperable, and your business goes dark. Every minute and every megabyte has a cost. Are you fully protected? Quantum protects the world's mission-critical data with simple, scalable storage solutions from the desktop to t data centre

BACKUP BASICS

ULTRIUM LTO

DLT TAPE

TAPE DRIVES

From entry-level to enterprise, Quantum tape drives are inexpensive devices to protect your data

QUANTUM SDLT 600
INTERNAL TAPE DRIVE, SCSI 160, BLACK (TR-S)



NEW!

Featuring an unprecedented 72MB/s compressed transfer rate and a colossal 600 GB of compressed storage, there's never been anything quite like it.

Q9119 Rent* $65.86/wk **$7,399**

QUANTUM DLT VS80
RACKMOUNT, SINGLE DRIVE. QUICK INSTALL.



Quantum DLT VS80 rackmount, single drive. Quick install/start guide, warranty card, power cord, mour hardware, shunt jumper, SCSI cable.

N3113 Rent* $35.28/wk **$3,55**

TAPE LIBRARY

For maximum capacity and performance, Quantum M-Series tape libraries can back up over 60TB of mission -critical data
M1500 - QUANTUM M1500SX TAPE LIBRARY



Native capacity for SDLT 600 of 6.3TB at 36MB/s native transfer rate . Base-library configurable from zero to two drives and up to 25 cartridge slots. Supports SDLT 320, SDLT 600, and LTO-1™, and LTO-2™ tape drives. Driveless configuration available for "capacity-only" scalability. Stack ten, manage as one.

M3880 Rent* $158.48/wk **$19,699**

TAPE AUTOLOADER

Quantum autoloaders hold up to 16 tapes and autom tape rotations saving manual time and increasing ba reliability.
QUANTUM VALUELOADER WITH LTO-2



In comparison to stand-alone tape drives, the ValueLoader(tm) offers increased capacity and rand access to several cartridges without human interver - the number one cause of data loss.

P7197 Rent* $93.99/wk **$11,59**



QUANTUM MEDIA

Quantum now offers a full line of media from DLTtape media, to LTO Ultrium, DAT and DDS data cartridges depending on your specific media requirement **Call Harris Technology's storage specialists on 1300 13 9999 for the ful range of Quantum data protection solutions.**

/IRELESS TECHNOLOGY FROM NETCOMM

UPER-G WIRELESS GATEWAY
620W



OADBAND WIRELESS ROUTER FOR CABLE OR SL MODEMS FEATURING TRIPLE SECURITY - T, SPI/DOS AND WPA

ether at home or in a small office, the NB620w lets manage various digital devices such as printers, cams and storage devices directly over a wired ireless network. It features two USB 2.0 ports for t and file serving and supports 11Mbps, 54Mbps 802.11 'Super-G' (IEEE enhanced) wireless. NB620w is compatible with any operating system uding Windows, Apple Macintosh and Linux. itional features include web content filtering, UPnP, al server/port forwarding and VPN Passthrough. o tutorials are also provided to ensure easy figuration and set-up.

4600 **$299**

DOOR MONITORING IP CAMERA
4000



NS4000 is an inexpensive solution for remote itoring of indoor areas such as foyers, hallways, ption areas, retail stores or hotel lobbies. camera features 640 x 480 resolution, real-time o at maximum resolution, a CMOS VGA image sor, an interchangeable CS mount lens, a COM for dial-up or ADSL modem connection and a O port (4 input/1 output) to control devices such as ning doors and gates. It also provides basic video rol functions of white balance, autogain control and tronic shutter.

190 **$549**

ADSL/ADL2 ETHERNET MODEM ROUTER + BONUS^ MINI WEB CAM
BP5CAM



THE NB5 IS THE NEXT GENERATION ADSL MODEM/ROUTER WITH SUPPORT FOR ADSL2 AND ADSL2+

The NB5 features an active firewall and is equipped with VPN pass-through for standard VPN client for point to point communications. Other features include QoS (Quality of Service), port forwarding and UPnP. Best of all, when your ADSL service is upgraded to ADSL-2, you can upgrade your NB5 with a simple download from NetComm.

^MINI WEB CAM INCLUDED

USB interface, 30 frame per second, high quality video and still image capture Mini Web Cam.

Q5986 **$149**

WEB MANAGED SWITCH
NP3016 - 16 PORT



NetComm's 16 port Web Smart Gigabit Switch provide a simple solution for network engineers to build or upgrade their network infrastructure to Gigabit Ethernet. Besides the benefit of Gigabit, this device provides a host of Web based management features-such as, VLAN, Trunking, Port- Mirroring, Port-Based QoS and a host of reporting tools. Easily managed via the user-friendly web browser interface, all 16 ports support 10/100/1000Mbps network speeds, Full & Half duplex modes and are also plug-and-play. Also available in 24 ports.

Rent* $10.07/wk

P2350 **$899**

WIRELESS ULTRA SERIES SINGLE & 'TWIN' PACKS

54Mbps WIRELESS PCI CARD



NP542

P7567 **$69**

'TWIN' PACK
54Mbps WIRELESS PCI CARD
NP542 (PACK OF 2)

P5828 **$119**

54Mbps WIRELESS PC CARD
NP543



P8141 **$69**

'TWIN' PACK
54Mbps WIRELESS PC CARD
NP543 (PACK OF 2)

P6962 **$119**

11G WIRELESS ADAPTOR USB2
NP544



P7945 **$69**

'TWIN' PACK
11G WIRELESS ADAPTOR USB 2
NP544 (PACK OF 2)

P6483 **$119**

Call us on 1300 13 9999 to find out more about NetComm's wide range wireless products including routers, wireless access point, bridges, antennas and wireless range boosters, hotspots and more.

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NETGEAR™

SMART WIRELESS NETWORKING

WGU624 - DOUBLE 108Mbps WIRELESS ROUTER



The Netgear WGU624 Double 108Mbps Wireless Router operates in either of two 108Mbps modes, similar to having 2 networks in one product. The first 108 Mbps mode is compliant with standard 802.11g, while the second is an 802.11a network free from interference by other wireless traffic such as microwave ovens and cordless phones, and thus ideal for applications such as video streaming.

Q3903 **$229**

WG511U DOUBLE 108Mbps WIRELESS PCMCIA CARD



The Netgear WG511U Double 108Mbps Wireless PC Card, when used with the WGU624 Double 108Mbps Wireless Firewall Router, allows a notebook PC user to choose between two 108Mbps modes. The first 108Mbps mode is compliant with standard 802.11g, while the second is a private network free from interference by other wireless traffic, and thus ideal for applications such as video streaming.

Q6852 **$120**

Check out **www.netgear.com.au/warranty** for full warranty options

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DG834- DSL MODEM ROUTER 4 PORT 10/100 SWITCH



- Integrated ADSL Modem is future proof with support for ADSL2+, router switch and firewall
- Protection from Denial of Service attacks and SPI firewall
- Easy to use with Smart Wizard Install Assistant and a multilingual user interface

L2610 **$159**

DG834GT- DSL MODEM/FIREWALL/ROUTER/ 54Mbps ACCESS POINT/SWITCH



- All in One Gateway combines ADSL2+ modem, router, firewall, Super G access point and 4 port sw
- 108Mbps Wireless Speed with Super G Technology (when used with Netgear 108Mbps adapters)
- Easy to set-up, Smart Wizard gets you up and running in less than 5 clicks
- Over 10 security & privacy features including a double firewall (NAT + SPI)

Q5517 **$29**

WG111T - 108 Mbps WIRELESS USB 2.0 ADAPTER



- Fast 108Mbps speeds for your desktop or notebook PC
- Up to 10x faster than 802.11b and up to 4x the range of 802.11b wireless
- USB 2.0 powered - up to 40x faster than USB 1.1
- Quick and easy setup with Smart Wizard install assistant
- Included 5 ft. USB cable allows adapter to be positioned for optimal signal strength
- 54Mbps also available

Q9015 **$139**

WGT624 - 108Mbps CABLE/DSL WIRELESS ROUTER



- 108Mbps wireless speed (when used with Netgear 108Mbps Adapters)
- Easy to set-up, Smart Wizard gets you up and running in less than 5 clicks
- Over 10 security & privacy features including a double firewall (NAT + SPI) and WPA
- One 10/100Mbps Internet port and 4 port Ethernet 10/100Mbps Switch
- Multi -VPN pass-through support (2, IPSec, and multiple L2TP & PPTP)
- 54Mbps also available

L6032 **$17**

FWG114P- CABLE/DSL PROSAFE WIRELESS ROUTER



- Integrated 54Mbps 802.11g wireless access point
- Advanced security with Stateful Packet Inspection (SPI) firewall, IPSec, PPTP, L2TP VPN pass-through support, WPA and WEP security for wireless
- 2 x VPN tunnels
- DB-9 port included to support an ISDN or analog modem connection
- Built-in USB print server

L2431 **$365**

FVS338 - PROSAFE VPN FIREWALL 50



- Initiates up to 50 Hardware-Based VPN tunnels
- Advanced security using Stateful Packet Inspection (SPI) firewall Denial of Service (DoS) Protection and Intrusion Detection
- Supports Netgear's ProSafe Network Management Software NMS100 or any SNMP-based management software
- Optimised for use with Netgear ProSafe VPN Client Software VPN01L or VPN05L

R0166 **$45**

NETGEAR™

FFORDABLE, SIMPLE POWER OVER ETHERNET FROM NETGEAR

S108P 8 PORT 10/100 DESKTOP SWITCH W/4 PORT POE



FORDABLE, EASY TO USE POWER OVER ETHERNET SWITCH FOR SMALL OFFICES

gear's 8 port Power over Ethernet switch delivers industry-standard 802.3af power on up to four ports, while ntaining connectivity to standard 10/100 devices on the rest. Now small office environments can quickly install compliant devices such as wireless access points and IP surveillance cameras where AC power is difficult ccess. Power is delivered over the Cat-5 cable, eliminating the need for electricians to install outlets high on s or ceiling—typically the optimal location for these devices. The switch is easy to install and use, with power omatically supplied as needed. The FS108P delivers affordable PoE in a quiet, durable desktop package.

- upply power to wireless access points and surveillance cameras over Cat-5 cabling
- EE 802.3af power on up to 4 ports
- 10/100Mbps Ports with AutoUplink™
- nall, compact, quiet design fits on desktop or wall
- ero configuration required—power is automatically supplied to compliant devices

9509 **$279**

DSAFE SWITCH GS748T 48 PORT GIGABIT ART SWITCH



- non-blocking 10/100/1000Mbps ports in 1U form-ctor
- ber options enable long distance connections tween switches
- nart Management features for trunking, VLANs, and ffic prioritisation

Rent* $23.32/wk

9557 **$2,255**

FS726T PROSAFE 24 PORT 10/100 SMART SWITCH WITH 2 GIGABIT PORTS

NEW!



- Management features for trunking VLANs and travvid prioritisation
- 24 10/100Mbps ports and One SFP GBIC slot
- Two gigabit ports
- 17" rack-mountable case

Rent* $6.22/wk

R0482 **$555**

M7224 24-PORT LAYER 2 MANAGED GIGABIT TCH



- /10/100/1000Mbps ports
- mplete Layer 2 management suite
- n-blocking performance
- xibility of fiber connections with combo ports

Rent* $20.50/wk

2108 **$1,829**

GSM7324 24-PORT LAYER 3 MANAGED GIGABIT SWITCH



- 24 port of Gigabit Ethernet
- 4 SFP slots for optional fiber gigabit connections (shares with RJ-45 port)
- Complete Layer 3 software- OSPF, RIP I/RIP II, Static, VLAN routing

Rent* $54.43/wk

J6587 **$5,899**

WG302- PROSAFE 802.11G WIRELESS ACCESS POINT



- High-speed networking with IEEE 802.11g, up to 108Mbps in turbo mode
- Powerful RF management and control with AutoCell technology
- Wi-Fi Protected Access (WPA), 802.11i-ready security
- Wireless Distribution System (WDS) support bridging and repeater modes
- Integrated IEEE 803.3af Power over Ethernet (PoE)
- 2 detachable 5 dBi antennas

L8310 **$449**

WG102 - PROSAFE™ 802.11G WIRELESS ACCESS POINT



- IEEE 802.3af Power over Ethernet support for easy installation
- 802.11i-ready, advanced security and management features with Wi-Fi Protected Access and 802.1x RADIUS
- SNMP-Manageable
- High-speed networking with IEEE 802.11g, up to 108Mbps in turbo mode
- Wireless Distribution System (WDS) support bridging and repeater modes
- 1 detachable 5 dBi antenna
- 802.1x, VPN Pass-through, MAC address authentication

Q0634 **$249**

***RENTSMART**

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D-Link®
Building Networks for People

WIRELESS / BROADBAND SOLUTIONS

DIS-101 BASE HOME NETWORK INSTALLATION PACKAGE (INITIAL INSTALLATION OF NETWORK)

- Base home network installation package for initial installation of network
- Connect up to 2 PCs (desktop and/or laptop)
- Connect 1 D-Link router
- Install 2 D-Link network adapters
- Connect D-Link router to existing broadband connection
- Share Internet connection between 2 computers
- Perform standard testing

R1400 **$169**

DIS-102 D-LINK INSTALLATION SERVICES - EXTRAS PACK

- Used in conjunction with DIS-101
- Ability to connect an:
  - additional PC (Desktop and/or Laptop)
  - additional printer
  - multi-function device
  - D-Link Wireless Access Point or Router
  - D-Link Internet Video Camera or Broadband Video Phone
  - Game Console

R1401 **$49**

PLEASE NOTE:
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D-LINK DWL-2000AP+ AIRPLUS G+ 11/22/54Mbps WIRELESS ACCESS PT



With the enhancement of Atheros new Super G™ mode, the DWL-2000AP can achieve wireless speeds up to 15x faster than standard 802.11b in a pure Super G environment through the use of new wireless techniques such as Packet Bursting, FastFrame, Compression & Encryption, and Turbo mode. This provides a bandwidth large enough to handle video/audio streaming and Video on Demand (VoD) applications.

L6048 **$165**

D-LINK DWL-G650+ 11/22/54Mbp W/LESS LAN PCMCIA CARD



This adapter supports high-speed wireless networking of up to 54Mbps, while providing seamless interoperability with all existing 802.11b and 802.11b+ wireless equipment. Together with better security, this adapter is the ideal wireless solution that offers an upgrade to a fast, new technology while protecting your past investments through interoperability with you current network equipment.

L6046 **$7**

D-LINK DWL-G520+ 11/22/54MBP WIRELESS LAN PCI ADAPTER



The DWL-G520+ provides speeds of up to 54Mbps when TM used with other D-Link AirPlusXtremeG+ and other 802.11g products. This enhanced speed and adoption of 2.4GHz frequency, now available for public use in most countries, plus the mobility and convenience inherent in a wireless LAN, make this card an ideal solution for bandwidth intensive WLAN applications.

L6045 **$79**

D-LINK DI-624+ AIRPLUS WIRELESS G+ ROUTE



The D-Link 802.11g DI-624+ Xtreme G features robust security to protect the wireless network from intruders, complying with the latest wireless networkin security protocols, including WEP encryption and Wi-F Protected Access (WPA) support for both 802.1x and WPA-PSK. The DI-624+ is also capable of supporting the government-grade AES encryption and upcoming 802.11i standards.

L5437 **$16**

D-LINK DI-724P+ WIRELESS G ROUTER + 4 PORT SWITCH



At up to 54Mbps, this router provides wireless LAN users a very high data transfer rate. Real wireless LAN throughput is about 8 times faster than that of 802.11b devices. In addition, adoption of the 2.4GHz frequency, now available for public use in most countries, makes this router an ideal solution for bandwidth intensive WLAN applications.

M2928 **$199**

D-LINK DI-824VUP+ WIRELESS G VPN ROUTER FOR DSL/CABLE



With built-in wireless LAN, a 4-port switch and print server, this router provides ready connection for workstations, file servers and printers, with or without network wires. These built-in functions save you the c and trouble of installing a separate wireless access po an Ethernet switch and a print server.

N0963 **$29**

ACCESS POINTS & BRIDGES COME WITH A 3 YEAR WARRANTY

D-Link
Building Networks for People

NTERPRISE NETWORKING SOLUTIONS

GS-3224TGR

100/1000MBPS GIGABIT LAYER 2 SWITCH



Link's DGS-3224TGR is a high performance managed Layer 2 Gigabit switch that provides an ideal solution for erprise Gigabit applications. With (24) 10/100/1000Mbps Gigabit Ethernet ports with (4) combo SFP slots, the S-3224TGR is designed to meet the needs of the most demanding departmental and enterprise connectivity plications.

Rent* $31.89/wk

N6588 **$3,109**

GS-3324SR

PORT MANAGED LAYER 3 GIGABIT STACKING AVE WITH 4 COMBO MINI-GBIC PORTS & EGRATED 10GBPS STACKING.



e architecture of the DGS-3324SR supports stacking p to 10 units in any combination using the integrated r 10Gig stacking ports in a "Fail-Safe Ring" figuration.

e DGS-3324SR is the first in a new series of "Next neration" high performance stackables from D-Link tems. The DGS-3324SR blends many features cally found in more expensive chassis based tions (high density, hot swap, redundant power ons, and high performance) with the price and ibility of a stackable.

Rent* $38.14/wk

5492 **$3,869**

DGS-3324SRi

24-PORT MANAGED LAYER 2/3 COPPER GIGABIT STACKING MASTER WITH 8 MINI-GBIC PORTS & 6 INTEGRATED 10GBPS STACKING AND OPTIONAL 10GBPS UPLINKS.



The DGS-3324SRi operates as a high performance external switching fabric for the DES-3352SR and DGS-3324SR series stacking products. The "Star" architecture of the DGS-3324SRi offers many of the same advantages as traditional chassis based solutions such as dedicated bandwidth, removable flash memory system, optional redundant power and hot-swappability. Along with its high availability architecture, the DGS-3324SRi supports ASIC Based Layer 3 routing (RIPv1/v2, OSPF, and DVMRP), multi-layer traffic classification, and L2/L3/L4 Access Control Lists.

Rent* $61.41/wk

N1048 **$6,899**

FL-1100



L-1100 Network Security Firewall for enternal works
dvanced Firewall Security
rong AES Encryption for Secure VPN
anage up to 1000 VPN Tunnels

Rent* $33.33/wk

6662 **$3,359**

DS-605

NETDEFEND VPN REMOTE ACCESS SOFTWARE - 5 USER LICENCE

- It is designed for Virtual Private Network products & terminates against IPSec gateways, such as the D-Link VPN routers and NetDefend firewalls
- The connection can be established over a wired or wireless network, the public Internet or a private network
- This software supports all IPSec standards set in the RFCs
- The VPN Client SW provides mobile users with secure, reliable access to corporate resources through broadband, wireless and dial-up connections

R0483 **$165**

DEM-311GT

1-Port Mini-GBIC to 1000BaseSX Transceiver.Mini GBIC 10 1000BaseSX Multi-mode Fiber Tranceiver.Distance up to 550m.Suitable for DES-3250TG,DGS-1024T & future switch with Mini GBI

PORTS : 1 x 1000Base-SX , Fiber
MEDIA: Multimode fiber
OPERATION: Full of half duplex

H9627 **$409**

DEM-312GT2

1000BaseLX to Mini-GBIC Module (Multimode Fibre)

R1525 **$425**

DEM-310GT

1-Port Mini-GBIC to 1000BaseLX Transceiver.Mini GBIC to 1000BaseLX Single-Mode Transceiver.Distance up to 10km. Suitable for DES- 3250TG,DGS-1024T & future switches with Mini GBIC

PORTS: 1 x 1000Base-LX , Fiber
MEDIA: Multimode fiber
OPERATION: Full of half duplex
CONNECTOR: SC
SPEED: 1000Mbps

Rent* $7.61/wk

H9626 **$679**

***RENTSMART**
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SERVERLINK

INTELLIGENT KVM SOLUTIONS

SERVERLINK STAR KVM SWITCHES WITH BUILT-IN CABLES



Control two PCs with a single keyboard, monitor and mouse. All ServerLink Star KVM switches have audio and microphone support for multimedia applications.

2 PORT PS/2 KVM
Q5539 **$79**

2 PORT USB KVM
Q5540 **$89**

2 PORT PS/2+USB KVM
Q5541 **$85**

SERVERLINK SLIM KVM SWITCHES



Save desktop space from over-cluttering with the ServerLink Slim KVM. High Density 3-in-1 cables allow you to have a single connection at the KVM.

2 PORT KVM WITH CABLES
Q5542 **$119**

4 PORT KVM WITH CABLES
Q5543 **$199**

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SERVERLINK IP
ADD REMOTE IP ACCESS TO YOUR CURRENT KVM SWITCH

Access your servers from anywhere in the world! The ServerLink IP allows network administrators to manage, configure, troubleshoot and even reboot remote servers from any web browser. Businesses can now increase productivity by minimising downtime and reducing travel costs and expensive service calls.

Security for your sensitive data is assured using 128 bit Secure Sockets Layer (SSL) encryption with an MD5 and DAA encrypted login screen. The ServerLink IP allows you to connect directly to servers at the BIOS level and is compatible with most existing KVM switches.

So if you have an existing KVM switch and are looking for secure, affordable remote access, then order your ServerLink IP today. You can also take advantage of our IP bundles, where you will save money when you purchase the ServerLink IP together with a ServerLink Elite KVM Switch or ServerLink Rack Drawer.



Rent* $14.54/wk

Q5544 **$1,298**

SERVERLINK ELITE KVM SWITCHES
8 & 16 PORT 1U HIGH DENSITY SWITCHES



AUSTRALIAN MADE

Using high-density connections, these switches use only 1U of rack space making them the ideal choice for any server room where space is at a premium.

- On-screen display for simple management
- Supports video resolution up to 2048 x 1536

NB:ELITE KVM CABLES SOLD SEPARATELY

N6589 8 PORT ELITE KVM **$549**

Rent* $7.83/wk

N8989 16 PORT ELITE KVM **$699**

SERVERLINK RACK DRAWERS



15" TFT FLAT PANEL
With a 15" TFT LCD screen, keyboard, touchpad and integrated KVM switch, these LCM KCM switches sav you up to 1/3 of valuable rack space.

Rent* $24.81/w

H2100 SINGLE PORT PS2/VGA **$2,39**

Rent* $27.91/w

H2101 8 PORT KVM - PS2 /VGA **$2,69**

Rent* $32.81/w

H2103 16 PORT KVM - PS2/VGA **$3,19**

SB - STORAGE & CONNECTIVITY

OMSOL USB 2.0 FLASH RIVES

- Password protection for sensitive data
- FlashMail function for portable email
- PCLock function prevents unauthorised access to your computer
- SecretZip function compresses and encrypts data for increased capacity and added security



ont view Back view

Q5459	128MB	$45
Q5460	256MB	$75
Q5461	512MB	$115
Q5462	1GB	$199

B 2.0 ACTIVE REPEATER BLE - 5M



-102-5
end the distance of your USB ipherals beyond the maximum B specification of 5 metres.

2303	$49

USB BLUETOOTH ADAPTER



UBT-122
Quickly and easily add Bluetooth capability to your desktop or notebook computer.

Q7429	$75

USB 2.0 QUICKLINK 5-IN-1 CABLE



USB2-QL-02
QuickLink Connectors for all your USB devices. Complete with 2 metre cable & easy store pouch.

P9191	$29

B 2.0 DATA TRANSFER BLE



T-102
B 2.0 Data Transfer Cable.

1030	$59

USB 2.0 HDD 3.5" IDE ENCLOSURE



UHD-3502
USB 2.0 3.5" IDE enclosure 2.5" also available.

N0960	$99

4 PORT USB 2.0 POCKET HUB



UPH-402
USB 2.0 high-speed pocket hub.

N2301	$55

E1394 FIREWIRE PCI CARD



4-PCI
rt IEEE1394 FireWire PCI card.

8946	$45

USB 2.0 PCI HOST ADAPTER



UPCI-502
5 port USB 2.0 PCI controller card.

N2275	$39

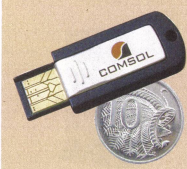
USB TO PS/2 ADAPTER



UKMC-100 USB to PS/2 keyboard & mouse adapter.

B0557	$34

COMSOL USB 2.0 MICROFLASH DRIVE



- Compact size - only 45mm long and weighs 3.6 grams.
- Supplied with detachable key ring for convenient connection to computer.

P7683	128MB	$55
Q2575	256MB	$89

CARDBUS ADAPTERS



- Instantly add High-Speed USB 2.0 ports or IEEE1394 FireWire ports to your notebook.
- Quick & easy installation - ideal for any mobile executive.
- Hot-pluggable with full Plug-and-Play support.
- Supports 32 bit CardBus PC Card type II slots.

N2270	2 Port USB 2.0	$55
N2272	3 Port FireWire	$55
P2062	4 Port Combo	$99

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LINKSYS®

A Division of Cisco Systems, Inc.

A LEADER IN WIRELESS NETWORKING

NETWORK STORAGE LINK FOR USB 2.0 DISK DRIVES
NSLU2



- Connects USB 1.1 or 2.0 disk drives and flash disks directly to your network
- Share music, video, or data files with managed access by user name or group
- Integrated file server - access your files from the Internet
- Built-in disk utilities - format, backup, and scandisk

P8510 **$229**

10/100 24 PORT SWITCH + 2 GIGABIT PORTS
SRW224



- 24 autosensing 10/100 full duplex, auto MDI/MDI-X ports
- Two Gigabit 10/100/1000BaseTX) MDI/MDI-X ports, and a mini GBIC expansion port
- WebView remote monitoring and configuration via web browser
- 64 VLANs, 7 port trunking groups, console port, 802.1p QoS support

R1140 **$499**

PLEASE NOTE:
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HIGH GAIN ANTENNA FOR SMA CONNECTORS
HGA7S



- Increases the effective range of Linksys wireless devices
- Stronger signal increases wireless coverage into hard-to-reach areas
- Improves through out by reducing retransmissions
- Easy installation - simply replace your current antenna
- Works with WRV54G, WMP54G, WMP54GS, WET54G, AS1SMA

R0361 **$99**

HIGH GAIN ANTENNA KIT FOR TNC CONNECTORS
HGA7T



- Increases the effective range of Linksys wireless devices
- Stronger signal increases wireless coverage into hard-to-reach areas
- Improves through out by reducing retransmissions
- Easy installation - simply replace your current antenna
- Works with WRT54G, WRT54GS, WAP54G, BEFW11S4, WAP11, AS2TNC

R1309 **$99**

ANTENNA STAND FOR SMA CONNECTORS
AS1SMA



- Relocate your antenna to avoid reflective or signal blocking obstacles
- Mounts on a desktop, wall, or ceiling
- Works with WRV54G, WMP54G WMP54GS, WET54G, HGA7S

R1356 **$59**

ANTENNA STAND FOR TNC CONNECTORS
AS2TNC



- Relocate your antennas to avoid reflective or signal blocking obstacles
- Supports antenna diversity for reliability and range
- Mounts on a desktop, wall, or ceiling
- Works with WRT54G, WRT54GS, WAP54G, BEFW11S4, WAP11, HGA7T

R1357 **$59**

10/100 4-PORT VPN ROUTER
RV042



- A high-reliability Internet connection-sharing router and 4 port switch for small business
- Features dual Internet ports for load balancing and connection redundancy
- Securely connects up to 30 remote office or traveling users to your office network via VPN
- Advanced SPI firewall protects your PCs from most known Internet attacks

R1358 **$399**

WIRELESS-G INTERNET VIDEO CAMERA
WVC54G



- Sends a high-quality live audio/ video stream to your network wirelessly over 802.11g - viewat from anywhere
- Built-in stand-alone web server, PC necessary
- Security Mode automatically se email alerts with video clips upc motion detection
- Supports up to four simultaneou remote users

R1359 **$42**

OMEGA EXTERNAL DRIVES

5GB/90GB REV DRIVE EXTERNAL USB2.0



iomega REV™

For a fraction of the cost of traditional backup systems, the Iomega® REV™ drive gives you removable storage with hard disk performance that's up to 8× faster than tape[1]. With compact, rugged 35GB disks that can store up to 90GB[2] of compressed data you can back up all your files, protect your system and save everything™.

Rent* $7.27/wk

N1763 **$649**

EV AUTOLOADER 1000 50GB ENTERPRISE SCSI



iomega REV™ REV BUILT IN™

- Up to 350GB[3] native capacity or 700GB with 2:1 compression
- Media data transfer rates of 12.7 to 25.4MB/sec
- Data seek –12 ms (milliseconds)
- Disk load–25-30 seconds average
- Zero maintenance required with Automatic Internal Head Cleaning and air filtration

Rent* $33.10/wk

R0652 **$3,335**

ETWORK HARD DRIVE 0GB / 250GB



iomega Network™

The Iomega network hard drive gives you up to 250GB of storage space for your home or small office network. Without adding the cost and complexity of a server, you can now share and store your critical files, photos, music, and video from any standard or wireless computer on the network. Installation is easy, just plug it in and share your files. Plus, with Touch-free™ Iomega Automatic Backup software included, your important files can be saved automatically. Just customise your backup settings and the software does the rest. Simply drag and drop to restore.

R0659 **160GB** **$484**

Rent* $7.49/wk

R0660 **250GB** **$669**

iomega NAS™

NAS 200d 320GB & 480GB



An easy, affordable way for small or medium businesses and workgroups to manage, share and protect business critical information in a networked environment. Available in 320GB or 480GB capacities with RAID protection using Windows Storage Server 2003 for Seamless integration so you are up and running in minutes. Saving you time and money.

320GB Rent* $24.08/wk

N9928 **$2,329**

480GB Rent* $33.69/wk

R0648 **$3,285**

1 Based on DDS-4 tape comparison

2 Compressed capacity assuming 2.6:1 data compression with "high" compression setting on Iomega Automatic Backup Pro software. This capacity may vary since compression is data and software dependent.

3 Compressed capacity assuming 2:1 data compression with software. This capacity may vary since compression is data and software dependent.

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STORAGE SOLUTIONS

LACIE Porsche



EXTERNAL HARD DISKS
Designed by the world-famous Porsche Design Agency, these LaCie Hard Drives exhibit world-class style and elite performance. Built to be lightweight and durable and can be easily moved for sharing and exchanging data files. Available with Hi-Speed USB 2.0 interface. Other features include effortless setup and secured rubber feet for easy stacking.

D2



EXTERNAL HARD DISKS
LaCie d2 drives have been esigned for professional users in mind. Beyond the fact that they are robust, lightweight, fast cooling and noise free, these drives have unique features such as Kensington cable lock slot, autoswitch power on/off with your computer and are rackmountable in 19" rack.

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Porsche EXTERNAL HARD DISKS



Porsche SERIES	Porsche 80GB	Porsche 160GB	Porsche 250G
RPM	7200rpm	7200rpm	7200rp
INTERFACE	USB 2.0	USB 2.0	USB 2
PART	L8441	L8442	L872
PRICE	$229	$299	$37

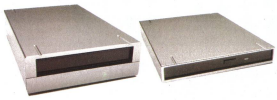
d2 EXTERNAL HARD DISKS



d2 SERIES	d2BD 320GB	d2BD 500GB	d2BD 1000G
RPM	7200rpm 8mb	7200rpm 8mb	7200rpm 8m
INTERFACE		USB 2.0, FireWire & F800#	
RENT*	Rent* $7.27/wk	Rent* $10.07/wk	Rent* $19.61/w
PART	Q5707	M1506	M28
PRICE	$649	$899	$1,75

#F800 is a new FireWire interface doubling transfer rate (up to 100MB/s) of current FireWire interface. Requires specific F800 card to take advantage of the performance.

Porsche EXTERNAL DVD±R/±RW /DUAL LAYER



LaCie new dual layer & dual format DVD±R designed by FA Porsche now burns 5 different DVD formats & 2 CD formats. LaCie Porsche Slim DVD±R drives come in a small sleek casing bus powered through USB 2.0 or FireWire. No power supply required.

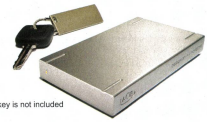
Porsche DVD±R16X DL4X USB 2.0

P8473	$285

Porsche SLIM DVD±R8X DL2.4X. USB 2.0 BUSPOWERED

P8475	$379

Porsche MOBILE HD



NB: The key is not included

LaCie mobile drives, designed by FA Porsche, are th perfect companion to back up your notebook or use transfer data from one computer to another. Made o magnesium and bus powered through the USB 2.0 c firewire port. Weight only 200g and is 1.7 x 7.6 x 1.3 in size.

40GB Porsche MOBILE HD USB 2.0

L8434	$27

80GB Porsche MOBILE HD USB 2.0 & FIREWIRE

P8482	$49

D/DVD PRODUCTION

OPYSMARTBLAST DVD DUPLICATORS

evocept

ONUS
IN CD/DVD PRINTER





urn discs fast with these new speedy stand alone
uplicators
Up to 16x DVD with DL support
anging from 3 to 7 drives simultaneously burning
uilt-in 120GB Hard Disk with new USB 2.0 PC
onnection for image management
D only models also available.

BONUS OFFER

BONUS SPIN PRINTER WITH EVERY COPYSMARTBLAST DUPLICATOR

Offer now extended until 31/03/05

2085	3 DVD±R	Rent* $17.92/wk	**$1,599**
2086	5 DVD±R	Rent* $24.64/wk	**$2,199**
2087	7 DVD±R	Rent* $26.88/wk	**$2,599**

RAVOPRO DUPLICATE/PRINT

NEW

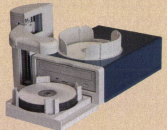
BravoPro DISC PUBLISHER by PRIMERA TECHNOLOGY, INC.

rofessional,all-in-one CD/DVD publishing on your
esktop
tally automated and hands free
Burning Drives & 4800dpi printer
fterburner Print Technology for fastest throughput
its class
0 disc capacity
etworking Software included
C and Mac platform software included



9576	2 CD-R	Rent* $48.90/wk	**$5,299**
9577	2 DVD±R	Rent* $55.36/wk	**$5,999**

MINI CUBIS DUPLICATOR



THE WORLD'S SMALLEST AUTOMATED DUPLICATOR!
This compact device automatically loads, burns and unloads up to 25 discs at a time. Also compatible with business card and 8cm discs.

		Rent* $ 10.07/wk	
Q2015	1 CD-R		**$899**
		Rent* $13.43/wk	
Q2051	1 DVD±R		**$1,199**

RIMAGE 2000i CD AND DVD PUBLISHERS



RIMAGE

- 2 drives CD or DVD
- 100 disc capacity
- Incorporates new 480i CD/DVD Printer
- Network software supports PC or MAC clients
- Up to 2 units on one PC
- Plug and Play

		Rent* $ 53.51/wk	
N2212	2 CD-R		**$5,799**
		Rent* $59.97/wk	
N2213	2 DVD±R		**$6,499**

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SAMSUNG

DRIVES TO FIT YOUR EVERY NEED

COMBO DRIVE

52X 32X 52X CDRW 16X DVD



- Speeds ranging up to 52x writing, 32x rewriting, 52x CD reading, and 16x DVD reading
- EIDE/ATAPI interface
- High capacity buffer memory of 2MB
- Can be mounted both horizontally and vertically
- Includes Samsung DVA (Dynamic Vibration Absorber)

BLACK

R1747 **$79**

BEIGE

R1690 **$79**

INSTALLATION



Harris Technology support services can help you with all your installation needs.

Call us on **1300 13 9999** to find out more.

PLEASE NOTE:
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DVD+/-R/RW 16X EIDE DOUBLE LAYER

Quick and quiet. You wont even know its there.

Whether it be a mountian of music, a home movie of epic proportions or a lifetime of digital memories, the sky's t limit with Samsung's new dual layer DVD burner. Store almost twice as much as standard DVD writers at blisteri speeds, including 16x DVD+R, 12x DVD-R, 32x CD-RW and 48x CD-ROM. The Samsung 16x WriteMaster - it's head and shoulders above the rest.

- **Writing:** DVD+R, DVD+RW, DVD-R, DVD-RW, CD-R, CD-RW
- **Reading:** DVD+R, DVD+RW, DVD-R, DVD-RW, CD-R, CD-RW, DVD-ROM, CD-ROM
- **Buffer:** Under Run Free Technology
- **Writing:** DVD+R double layer 2.4x

HOT PRICE!





Writemaster

R1703	BLACK	$14
R1741	BEIGE	$14

Maxtor

AXTOR ONETOUCH™ - SMART STORAGE WITH PUSH-BUTTON BACKUP

NETOUCH™ SERIES

e Maxtor OneTouch™ drive - just press the button
l your files are backed up in one simple step. It's
ply the faster backup. Faster than CD. Faster than
ppy. Faster than removable cartridge systems.
ace for your photos, videos, graphics, music,
uments and more. It connects to FireWire or USB
ts on a PC or MAC. It backs up with the Maxtor
eTouch™ button or runs automated backups using
included software, Dantz® Retrospect® Express.
l you can customise the button to launch any
lication. Powerful, yet simple backup. Fast, flexible,
e capacity.



EATURES

atent-pending Maxtor OneTouch™ technology
ug and play storage
ot-swappable
nodised aluminum design
tands vertically or horizontally
antz® Retrospect® Express backup software
cluded
ustomisable Maxtor OneTouch™ button
ower management and on/off switch
hisper-quiet FDB motor
AC formatted (for MAC models)
xford 911 chip (Firewire models)
onnect additional drives
ensington security lock compatible

UICK AND EASY STALLATION

1. INSTALL THE SOFTWARE
2. PLUG IN THE DRIVE
3. PUSH THE BUTTON AND FOLLOW ON-SCREEN DIRECTIONS

LE 80/120GB

Perfect for home or office
The Maxtor Personal Storage™ LE external hard drive quickly adds storage and organisational space through your computer's USB port.

M1293	80GB	**$199**
K7753	120GB	**$249**

DV 160/200/250GB

Perfect for video editing and high-end graphics
The Maxtor 7200RPM Hard drive featuring both Firewire (IEEE 1394, iLINK) and USB 2.0 interface ports for your PC.

M1296	160GB	**$299**
K7754	200GB	**$349**

ONETOUCH™ SERIES II

ALL NEW FEATURES

MAXTOR ONE TOUCH SERIES II UTILISES ALL THE FEATURES OF THE ORIGINAL MAXTOR ONE TOUCH SERIES AND COMBINES THEM WITH THESE GREAT NEW FEATURES:

- Default installation backs up every local drive automatically
- Saves historical backup versions
- Full system restore to an earlier version
- Simple diagnostics check the health of your drive with a single click
- Tuneable drive performance



Q3145	250GB	**$399**
Q3146	300GB	**$449**

PLEASE NOTE:
All purchases subject to terms & conditions and returns policy. Delivery charges may apply. Not all items stocked in store but available for pick-up/delivery.

SanDisk®

MEMORY CARDS AND CONNECTIVITY SOLUTIONS

COMPACT FLASH MEMORY CARDS

Compact Flash technology has resulted in the introduction of a new class of advanced, small, lightweight, low-power mobile products.

- High transfer rate for fast copy
- High storage capacity
- Non-volatile solid-state; no moving parts maximise battery power. Data is not lost when power is turned off



D5310 256MB **$52**



J0492 512MB **$89**



E8511 1GB **$150**

PLEASE NOTE:
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SANDISK SD 5 IN 1 MOBILE READER AND 128MB SECURE DIGITAL CARD

SandDisk's MobileMate line of mobile readers are the smallest readers on the market & unique in its compatibility class (SD/ miniSD/ MutiMediaCard/ RSMMC/ TransFlash), ideal for memory-enabled mobile phone users and photo travel needs.

The flash memory cards can be plugged directly into the readers. No card adapters are required. Carry it with you so you always have access to your important data.



Images for illustration purposes only

R1187 SANDISK 5 IN 1 SD MOBILE READER & 128MB SD CARD **$5**

CRUZER MICRO FLASH DRIVES



P0697 128MB USB 2.0 **$41**

P0698 256MB USB 2.0 **$64**

P0699 512MB USB 2.0 **$99**

CRUZER MINI FLASH DRIVE



P5250 1GB USB 2.0 **$16**

EADERS IN VISUAL DISPLAY TECHNOLOGY

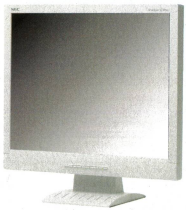
'' LCD MONITOR



CUSYNC LCD72V
80 x 1024
0:1 Contrast ratio
in frame design

2329	BLACK	$498
2328	WHITE	$498

'' LCD MONITOR



CUSYNC LCD92V
80 x 1024
alogue input
de viewing angle
in frame design

Rent* $8.95/wk

5546	BLACK	$799
5545	WHITE	$799

20" LCD MONITOR



MULTISYNC LCD2060NX
- 600:1 Contrast ratio
- Analogue and digital inputs
- Height adjustable
- 1600 x 1200 resolution

Rent* $17.82/wk

Q6093	BLACK	$1,590
Q6094	WHITE	$1,590

19" LCD MONITOR



MULTISYNC LCD1970NX
- 1280 x 1024
- Analogue and digital inputs
- Wide viewing angle
- Thin frame design

Rent* $11.15/wk

Q2331	BLACK	$995
Q2330	WHITE	$995

NEC PROJECTORS

HT410

NEW



- 16:9 Aspect ratio
- 854 x 480 DMD resolution
- 1000 Ansi lumens
- 1200:1 Contrast Ratio

Rent* $23.20/wk

Q4953 **$2,070**

VT47G



- 1500 ANSI lumens
- Compact 2.9kg
- SVGA Resolution
- Quiet operations (28dB in Eco Mode)
- Lamp life 2000 hours
- Short focus lens

Rent* $15.24/wk

N9298 **$1,360**

VT470G



- 2000 ANSI lumens
- SVGA Resolution
- Compact 2.9kg
- Security functions
- Quiet operations (32dB)
- Lamp life 2000 hours
- Auto keystone correction

Rent* $20.73/wk

P6583 **$1,850**

***RENTSMART**
The figures quoted are based on a per week basis over 3 years. Terms and conditions apply.

PLEASE NOTE:
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SAMSUNG

SYNCMASTER LCD MONITORS

913N 19" LCD



- Brightness: 300 cd/m²
- Contrast Ratio: 800:1
- Response Time: 8ms
- Analogue Interface
- Maximum resolution: 1280 x 1024

Rent* $10.63/wk

R1521 **$949**

910T 19" LCD



- Maximum resolution 1280 x 1024
- Contrast ratio 1000:1
- Dual interface
- Height adjustable & pivot stand

Rent* $11.08/wk

P2937 **$989**

***RENTSMART**
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730MW DUAL INTERFACE 17" LCD



ZERO DEAD PIXEL POLICY^ ON SAMSUNG LCD MONITORS

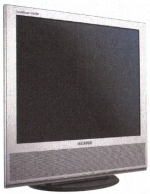
- 17" Wide
- Contrast ratio 500:1
- Maximum resolution 1280 x 768
- Dual interface
- Multimedia speakers

Special Features:
- Integrated tv tuner
- S-video
- HDTV ready
- PIP function

Rent* $10.36/w

P5689 **$92**

710MP ANALOGUE 17" LCD



- 17" Analogue Multi Function LCD
- Maximum resolution 1280 x 1024
- Contrast ratio 450:1
- Built in speakers
- NTSC (PAL), S-video,
- Built-in Tuner

Rent* $8.84/wk

M2768 **$789**

930MP DUAL INTERFACE 19" LCI



- Viewable area 19"
- Contrast ratio 750:1
- Maximum resolution 1280 x 1024
- Dual interface
- Multimedia speakers

Special Features:
- Integrated tv tuner
- S-video
- HDTV ready
- PIP function

Rent* $14.78/v

P7084 **$1,31**

^Please contact Samsung Electronics Australia for full Terms & Conditions.
Zero dead pixel policy on all Samsung LCD screens 15" - 40" identified and reported to Samsung Electronics Australia within 7 days of purchase by phone: 1300 362 603 or email: monitor.service@samsung.com.

ONY PROJECTORS

PLES2 LCD DATA PROJECTOR



- SVGA Resolution
- 1500 ANSI Lumens
- Ultra Long Lamp Life of upto 4,000 hours
- Screen Coverage upto 300"
- 6 Picture Mode
- HD Ready

With its superb quality and flexibility, the VPLES2 is ideal for the modern lifestyle. Designed to impress, it offers powerful multimedia projection capabilities for an exceptional large screen viewing experience.

Use it to play your favourite home movies, or to deliver a polished business presentation for a professional impact in the office.

Rent* $20.72/wk

9803 **$1,849**

PLDS100



200 ANSI Lumens
VGA Resolution

Rent* $17.40/wk

9989 **$1,530**

VPLEX1



- 1500 ANSI Lumens
- XGA Resolution

Rent* $30.67/wk

J9934 **$2,990**

PLCS7



00 ANSI Lumens
VGA Resolution

Rent* $24.04/wk

9962 **$2,325**

VPLCX70



- 2000 ANSI Lumens
- XGA Resolution

Rent* $36.71/wk

P4289 **$3,699**

PLCX75 LCD DATA PROJECTOR



GA Resolution
00 ANSI Lumens
ort Focus Lens
reen Coverage up to 300"
gital Zoom Function
eighs 2.9kg

The VPLCX75 is the latest ultra compact projector from Sony, delivering 2500 ANSI lumens with XGA resolution for outstanding image quality, even in bright rooms. Advanced Intelligent Auto Setup allows presentations to be started immediately. As soon as the power is turned on, the projector initiates a host of sophisticated set-up functions, including auto-focus.

Memory stick slot - There is no need for a PC. You can view Photos, Video Clips and Power Point presentations straight from the memory stick without the use of a PC.

Air shot wireless presentations - Eliminates the need for cable connections between the PC and Projector, making it easy to switch from one presenter to the next using the USB Wireless LAN module.

Rent* $42.64/wk

J290 **$4,325**

THE SONY ULTRA PORTABLE RANGE OF PROJECTORS

- **Intelligent Auto Setup**
  Allows presentations to be started immediately. When powered on the projector automatically initiates a host of sophisticated functions.
- **Digital Keystone Correction**
  Allows correct geometry for the image, even when installation space is limited.
- **Optical Zoom**
  Allows zooming in on an image without the loss of picture quality.
- **Password Protection**
  Deters theft and restricts use by unauthorised users.
- **Floor and ceiling mountable**
  Allows ceiling suspension to free up floor space.
- **Speakers built-in**
  Ideal for multimedia presentations.
- **Screen sizes up to 150" or 300"**
  Allows large images to be displayed in a restricted space.

SUPPLIED ACCESSORIES

- Remote Control
- Carry Case
- VGA Cable, Power Cable
- Spare Air Filter

- **2 Years Warranty**

***RENTSMART**
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invent

HP DIGITAL PROJECTORS

SB21 DIGITAL PROJECTOR



- DLP™ technology
- 1000 lumens in brightness
- SVGA
- High 1800:1 contrast ratio
- Extremely portable at 1kg
- Carry bag included
- 2 years (unit exchange) warranty

Rent* $23.52/wk

G8845 **$2,099**

VERSATILE VP6110 DIGITAL PROJECTOR



- DLP™ technology
- 1500 lumens in brightness
- High 2000:1 contrast ratio
- Picture-in-Picture feature
- Integrated 3-watt speaker
- Lamp Saver mode (3000 hours)
- 2.9kg
- 2 year (unit exchange) warranty

Rent* $24.64/wk

K1729 **$2,199**

Information regarding DLP™ technology provided by Texas Instruments from research conducted by the Munsell Colour Science Laboratory (MCSL) at the Rochester Institute of Technology.

***RENTSMART**

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NOW IS THE PERFECT TIME TO REPLACE YOUR OBSOLETE PRESENTATION HARDWARE AS HP WILL ALLOW YOU TO TRADE IN YOUR OLD HARDWARE FOR ATTRACTIVE CASH REBATES.

What's the catch? There isn't one, except that you have to buy at least one new HP projector.
You don't have to coordinate its purchase with the trade-in. Further, the trade-in need not be for the same type o item. It need only be an one-to-one exchange. For example, you can trade in an old monitor, overhead projector, or digital projector toward the purchase of a new HP digital projector. The old equipment does not even have to have been manufactured by HP; HP will take any brand that has a trade-in value. To find out what your existing c presentation hardware is worth visit **www.hp.com.au/tradein** or call HP on 1800 820 447.

With sleek curves, chic style, sophisticated looks and state-of-the-art technology - your view of digital projectors will certainly never be the same!

Leave your audience speechless with HP digital projectors' stylish design, superb colour rendition, excellent contrast, true-to-life image projection and simplicity to use. Whether presenting in or out of the office or relaxing home with a DVD, HP's range is the perfect solution.

HP MP3222 DIGITAL PROJECTOR

- DLP™ technology
- 2000 lumens in brightness
- XGA
- High 2000:1 contrast ratio
- Integrated speaker
- 1.7kg - carry bag included
- 3 years (unit exchange) warranty



Rent* $29.74/w

P7947 **$2,89**

HP MP3130 DIGITAL PROJECTOR

- DLP™ technology
- 1800 lumens in brightness
- XGA
- High 1800:1 contrast ratio
- Zoom lens
- Integrated speaker
- Extremely portable at 1.5kg
- 4000 hour lamp life (eco mode)
- Carry bag included
- 3 years (unit exchange) warranty



Rent* $38.44/w

L3520 **$3,89**

VERSATILE HP VP6120 DIGITAL PROJECTOR

- DLP™ technology
- 2000 lumens in brightness
- XGA
- High 2000:1 contrast ratio
- Picture-in-Picture feature
- Integrated 3-watt speaker
- Lamp saver mode (3000 hours)
- Ceiling mountable/portable 2.9kg
- 2 year (unit exchange) warranty



Rent* $30.71/w

K1736 **$2,99**

MULTIMEDIA

ONY SOFTWARE SOLUTIONS & HAUPPAUGE TV TUNERS

ONY SOFTWARE

ID PRO 5



ID Pro software is the original
p-based music creation
plication. Intuitive "pick, paint,
play" interface. Advanced
fessional features. Includes over
00 royalty-free loops.

1492 **$559**

VEGAS 5



Vegas software is the all-in-one, real-time solution for professional digital video and audio production, streaming content creation, and broadcast production on the PC platform.

N5573 **$755**

SOUND FORGE 8



New Sound Forge 8 software is the professional's choice for audio editing, recording, effects processing, streaming content creation, and more. Real-time editing and more

R1865 **$559**

UND FORGE AUDIO STUDIO



nd Forge Audio Studio software
you record, create, and apply
sic on your PC. Apply over 30
t-in effects and processes.
t-in CD burning.

3125 **$225**

ACID MUSIC STUDIO



ACID Music Studio software lets you create original music on your PC. Make mixes and remixes using studio-quality loops and effects. Record and edit live performances.

Q3124 **$225**

VEGAS MOVIE STUDIO+DVD



Vegas Movie Studio+DVD software makes it easy to capture and edit digital video on your PC. Create movies, slideshows, presentations, and burn your own DVDs.

Q3123 **$219**

AUPPAUGE TV TUNERS

UPPAUGE USB2



ch TV on your desktop
nposite or SVHS Input for
corder or Foxtel input.

Radio model also available.

2054 **$229**

HAUPPAUGE NOVA-T



Digital TV Tuner Card
High Definition (HD) and Standard Definition (SD) reception.
Record to disk and playback digital TV, very high quality picture and sound schedule, TV recording for later viewing, burn television programmes to DVD (requires DVD burning software.)

K8172 **$265**

HAUPPAUGE DEC2000



Standard Definition (SD) digital TV reception.
Works with or without PC connected.

K8168 **$399**

VEGAS+DVD PRODUCTION SUITE



The Vegas+DVD Production Suite includes Vegas, DVD Architect™, and Dolby Digital® AC-3 encoding software. Perfect for the professional media producer, it's everything you need to seamlessly edit video and audio, produce 5.1 surround mixes, encode to AC-3 le formats, and author DVDs on the PC platform. Vegas software is a comprehensive solution for scalable HD and DV production, sound editing and mixing, streaming content creation and 5.1 surround production. With Dolby Digital AC-3 Encoder software you can encode surround sound mixes to stereo or multichannel AC-3. DVD Architect software lets you develop menu-based DVDs, music compilations, movies, and slideshow presentations.

N8034 **$1,145**

HAUPPAUGE EXPRESS TV



Watch TV on your desktop
Composite Input for camcorder or Foxtel input.

M9423 **$99**

PLEASE NOTE:
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imation

INTRODUCING IMATION DUAL LAYER MEDIA

IMATION DISC STAKKA



- Perfect for business, studio and home use, with the Disc Stakka you need never waste time searching for a disk again!
- Stores, protects and retrieves up to 100 of your favourite CDs or DVDs.
- Fully motorised disc insert and eject helps protect your valuable discs.
- Simple to set up, linking to your computer via a single USB cable.
- Supplied with powerful OpDiTracker Disc Management Software - use to capture disc content, and then search an entire database of stored discs by title, keyword, directory or file name.

M4871 **$185**

IMATION DAT72 CARTRIDGE



The DAT72 format offers 72GB of compressed capacity (36GB native) and a 3MB/sec transfer rate. The DAT72 drive is also read/write compatible with DDS3 (12GB) and DDS4 (20GB) cartridges. DAT72 Cartridges are designed exclusively for DAT72 drives and libraries.

P5939 **$39**

PLEASE NOTE:
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IMATION 8.5GB

2.4X DVD+R DUAL LAYER - 1 PACK



R1517 **$11**

IMATION DVD-R

8X 4.7GB 10 PACK



R1240 **$16**

IMATION DLT

BLACK WATCH SUPER DLT TA 110GB/220GB or 160GB/320GB



G9333 **$9**

IMATION DVD-R

8X 10PK SLIM MOVIE BOX



R1241 **$18**

IMATION DVD-R

8X 10PK WHITE INKJET PRINTABLE-SLIM JEWEL CASE



R1243 **$16**

IMATION DLT

BLACK WATCH DLT IV CARTRIDGE 20/40GB, 35/75GB or 40/80GB



98425 **$4**

DVD+R 4x 4.7GB

50 PACK SPINDLE WHITE INKJET PRINTABLE



Q5595 **$69**

DVD-R 4x 4.7GB

50 PACK SPINDLE WHITE THERMAL PRINTABLE



Q5617 **$69**

DVD-R 4x 4.7GB

50 PACK SPINDLE WHITE INKJET PRINTABLE



Q5619 **$6**

PSON PRINTERS

SON AL-C1900 COLOUR LASER

o to 16ppm mono, 4ppm in
ll colour
S seconds first colour
ge print time
PSON ASIC imaging
chnologies
3MB memory standard,
pandable to 1024MB
tegrated network
erface
indows and Macintosh
ivers



Rent* $12.87/wk

8715 **$1,149**

EPSON AL-C4100 COLOUR LASER

- Up to 24ppm in full-colour
- 2400 dpi with Epson RIT
- Integrated 10/100 Base TX Network Interface
- Integrated Duplex Unit for two-sided printing!
- 600 page input standard



Rent* $33.84/wk

L5869 **$3,299**

SON STYLUS CX6500 INKJET MULTI FUNCTION

int up to 22ppm
ack
60 x 1440 optimised
i using RPM
chnology
PSON DURABrite
K - for highly
rable, water and
udge resistant
nts
int BorderFree up to
prints
andalone colour
pier
tbed colour image scanner



731 **$349**

EPSON AL C1100 COLOUR LASER

The EPSON AcuLaser C1100 is the affordable colour and monochrome laser printer that delivers high speed, photo quality prints for small businesses and workgroups that require a compact and easy-to-use solution.

NEW



The AcuLaser C1100 features the latest in EPSON's toner technologies - AcuBrite- and a new Wrap Transfer system to produce outstanding results first time, every time.

Rent* $9.92/wk

Q7367 **$885**

SON STYLUS PHOTO RX630 MULTI FUNCTION

to 17ppm for black text A4
emo)
60 x 1440 optimised DPI
ing RPM Technology),
rderFree printing up to

ividual ink cartridge
e for each of 6 colours
andalone colour copier
ctionality without
mputer.
gh resolution 2400 x 4800 dpi scanner featuring
our restoration software
nts from digital memory cards, direct from
tBridge cameras and direct from USB memory
vices



675 **$525**

EPSON PERFECTION 4870 PHOTO SCANNER

- Flatbed colour image scanner
- 4800 dpi with revolutionary MatrixCCD technology
- Integrated Transparency Unit (TPU) supporting four film holders
- Digital ICE automatic scan cleaning
- USB 2.0 and FireWire interfaces



Rent* $8.95/wk

L9381 **$799**

EPSON PICTUREMATE



THE EASY TO USE PERSONAL PHOTO LAB FOR THE HOME USER

EPSON makes creating photos from your digital camera simple, cost effective and convenient. With the EPSON PictureMate, creating lab-quality, highly durable, glossy photos has never been easier. And for less than 50 cents per photo, creating photos at home has never been more affordable!

- Lab quality 100 x 150mm border free photos without the need for a computer
- Support for most available digital camera memory cards (Compact Flash, Smart Media (Max 128MB), Memory Stick, Magic Gate Memory Stick PRO, Memory Stick Duo, Microdrive, SD Memory Card, Mini SD Card, MultiMedia Card, xD Picture Card)
- EPSON UltraChrome ink - featuring new red and blue ink for brighter photos
- Print photos directly from your PictBridge compatible digital camera
- Print directly from Bluetooth compatible mobile camera phones with the optional Bluetooth adaptor

P1646 **$359**

*RENTSMART

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SAMSUNG

QUALITY AND INNOVATION, NO RISK

SAMSUNG TONER

SAMSUNG ML 2150/2151N/ 2551N - 8,000 PAGE TONER CARTRIDGE
N1521 **$195**

SAMSUNG ML 2551N - 10,000 PAGE TONER CARTRIDGE
L7764 **$235**

SAMSUNG ML-2250 5000 PAGE TONER CARTRIDGE
Q2002 **$145**

SAMSUNG CLP-500 BLACK TONER 7000 PAGE YIELD
M9755 **$139**

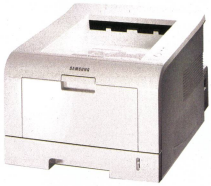
SAMSUNG CLP-500 CYAN TONER 5000 PAGE YIELD
M9756 **$155**

SAMSUNG CLP-500 MAGENTA TONER 5000 PAGE YIELD
M9757 **$155**

SAMSUNG CLP-500 YELLOW TONER 5000 PAGE YIELD
M9758 **$155**

***RENTSMART**
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SAMSUNG ML - 2250

MONO LASER PRINTER

- Prints up to 20ppm in A4 at maximum print resolutio of 1200 dpi
- Time-to-first-print - 10 seconds
- Comes complete with a 250 sheet paper cassette, plus a 50 sheet multipurpose feeder
- USB 2.0 and Parallel Connection
- PCL-6 driver
- Elegant ceramic gloss finish

Q1969 **$41**



SAMSUNG CLP - 500

COLOUR LASER PRINTER

- 5ppm colour, 20ppm mono
- Standard auto-duplexing
- Patented NoNois system
- Quiet - a colour laser as quiet as a mono!
- Comes with a 250 sheet paper cassette and 100 sh paper feeder
- Connectivity USB 2.0 (USB 1.1 Compatible)
- Windows compatible
- 3 years on-site warranty Australia wide

Rent* $7.49/

M0876 **$66**



SAMSUNG ML-2551N

MONO LASER PRINTER

- 3 year onsite warranty
- Speed(A4): 24ppm
- Resolution: 1200dpi max
- Processor: Samsung 266 MHz
- RAM (Std): 32 MB
- RAM (Max): 160 MB
- Monthly Duty Cycle: 100,000 pages
- Standard Interface

Rent* $11.71/

M4990 **$1,04**

LEXMARK™

HECK OUT LEXMARK'S WEBSITE FOR THEIR LATEST PROMOTIONS

XMARK P6250
VANCED FEATURES, IPLE PHOTO PRINTING



to 22ppm mono, up to 15ppm lour
00 x 1200 dpi for sharp, glossy otos
rderless prints
ll colour 2.5 inch LCD screen photo previewing
int directly from your digital mera
sily enhance, print & manage gital photos using the Exclusive xmark Imaging Studio Software an to email or print: 48-bit CIS tbed colour scanner

5740 **$349**

LEXMARK E230
AN EXCELLENT EVERY DAY PRINTER



- Outstanding performance in a desktop laser
- 17ppm A4 mono laser printer
- 100MHz processor and 8MB standard
- PCL6 emulation
- In-built 250-sheet paper drawer
- USB & parallel ports standard
- 1 year onsite exchange LexExpress warranty

Q2332 **$229**

LEXMARK X215
THE AFFORDABLE LASER MULTIFUNCTION SOLUTION



- Printer - 16ppm A4 laser printer & copier
- Copier - including 30-sheet ADF (or flatbed)
- Scanner - colour scan to PC (TWAIN)
- Fax - 33.6Kbps (Super G3) fax modem
- 250 sheet input drawer
- USB & parallel ports standard
- 1 year LexExpress warranty

L4391 **$489**

XMARK E232
FECT FOR PERSONAL OR SINESS APPLICATIONS



to 21ppm A4 mono laser nter
t 200MHz processor and MB standard
ss than 8.5 second time to t page
tional 550 sheet input wer
B & parallel ports standard ear onsite exchange kExpress warranty

333 **$399**

LEXMARK C510
HIGH QUALITY DESKTOP PRINTER FOR ALL YOUR COLOUR & MONO PRINTING



- 30ppm mono & 8ppm colour laser
- 64MB expandable to 320MB
- 500MHz processor
- 2400 image quality resolution
- PostScript 3 & PCL6 emulation
- 250-sheet input expandable to 780-sheets
- USB & parallel ports standard
- 2-Years next business day onsite warranty standard
- **Put it on your network** N4000e - M2857 **$265**

Rent*$8.95/wk

N2015 **$799**

LEXMARK T630
ULTIMATE SCALABILITY



- 33ppm mono laser
- 32MB RAM (64MB N & DN models)
- 300MHz processor
- Parallel & USB ports standard
- 350-sheet input expandable to 3850 sheets
- 2-Years next business day onsite warranty standard
- **Put it on your network** - T630n- K0331 **$1,789**
- **Print both sides** - T630dn - M4657 **$2,269**
- **Make it Multifunction** - X630 - K0359 **$3,779**

Rent*$16.80/wk

K0072 **$1,499**

LEXMARK TONER

LEXMARK E SERIES

Lexmark E Series 2,500 page toner cartridge. Suites Lexmark E230, E232, E330 & E323n laser printers.

P2866 **$115**

LEXMARK X215 3,200 PAGE TONER CARTRIDGE

L5690 **$105**

LEXMARK T SERIES

T630/T632 Return Program Black Print Cartridge

K0493 **$159**

T630/632 High Yield Return Program Black Print Cartridge

K0496 **$359**

LEXMARK C510 SERIES

C510 High Yield Cyan Cartridge

N5852 **$255**

C510 High Yield Magenta Cartridge

N5853 **$255**

C510 High Yield Yellow Cartridge

N5854 **$255**

C510 High Yield Black Cartridge

N5855 **$179**

***RENTSMART**

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Canon
advanced simplicity

ADVANCED SIMPLICITY

BUBBLEJET PLAIN PAPER FAX



Image: FAX-B822 model

Canon's unique UHQ (Ultra High Quality) imaging technology for sharper text and images. Transmission speed of up to 6 seconds per page**. Huge 120 page memory capacity**. Canon's Bubble Jet technology produces high quality fax prints. Telstra FaxStream Duet*** compatibility – enables you to get a separate fax and phone number on the one line. Ink saver mode allows you to print up to twice the amount of pages compared to normal mode – saving on ink costs (normal mode: 850, ink saver mode: 1500 pages). Up to 99 pages of multiple copying. 79 speed dials for easy access to frequently used numbers. Compact and stylish with handset included.

B840 only: built-in answering machine that holds up to 50 incoming messages; and Canon's UCAN Talk voice recognition.

** Based on Canon standard Fax Chart No. 1 in Standard Mode; 5% coverage on A4.

*** Where this service is available from your service provider.

FAX-B822
Q4627 **$199**

FAX-B840
Q3738 **$249**

***RENTSMART**
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LASER MULTIFUNCTION MF3110
PRINTER,SCANNER,COPIER



- Laser multifunction - printer, copier and scanner
- Prints at 19ppm, high resolution at 600 x 600 dpi and up to 2400 x 600 dpi enhanced
- 64MB SDRAM
- Fast laser copies of 20 cpm at 600 x 600 dpi, up to 99 copies at a time
- Colour CCD scanning at 1200 x 2400 dpi, TWAIN compliant
- USB interface
- Optional network printing (using C6200U network adapter

Q2460 **$449**

COLOUR LASER LBP2410



- Prints at 16ppm black, and 4ppm colour (A4, 5% coverage)
- Print resolution at 600 x 600 dpi (up to 9600 x 600 dpi enhanced)
- First print out time of 16 seconds black and 27 seconds colour
- 125 sheet paper capacity
- Uses CAPT (Canon Advanced Printing Technology)
- 8MB SDRAM no additional memory required (Hi-ScoA technology)
- USB interface
- Optional network printing (using AXIS -1611 network card)

Rent* $7.61/wk

J2427 **$679**

LASER MULTIFUNCTION MF5650
PRINTER,SCANNER,COPIER,FAX



- All in one compact design
- 50 page automatic document feeder
- Prints at 18ppm, high resolution at 600 x 600 dpi an up to 2400 x 600 dpi enhanced
- 64MB SDRAM
- Fast laser copies of 18cpm at 600 x 600 dpi, up to 9 copies at a time
- Colour scanning at 1200 x 2400 dpi, TWAIN compli
- Super G3 33.6Kbps fax modem
- Huge fax memory of up to 250 pages
- USB interface
- Optional network printing (using C6200U network adapter)

Rent* $7.27/

Q0124 **$64**

BUSINESS INKJET BIJ1300/ BIJ23



Image of BIJ2300 model

- Fast prints at up to 20ppm black and 18ppm colour
- Network ready - 10 BaseT/100 BaseTX interface
- High-density print head for accuracy and business quality documents
- New Colour Imaging Processing Technology to dete document type (images, text. etc) for optimised imaging result
- High volume 4 individual ink tanks to minimise ink wastage and operating costs
- Huge paper capacity: 350 sheets standard, support maximum of 1,350 sheets (BIJ1300) or 600 sheets (BIJ2300) with optional, additional paper trays
- Windows and Macintosh compatible

Rent* $11.19/

P3316 BIJ1300 **$99**

Rent* $14.78/

P9991 BIJ2300 A3 MODEL **$1,31**

HE VALUE FRONTIER



FS-1010

- Up to 14ppm A4
- Power PC 405 200MHz
- 600 x 600 dpi
- 16MB RAM (Max: 144MB)
- 12 seconds to print first page
- A4, B5, A5, letter, legal paper sizes
- 50 + 250 sheet input
- Parallel + USB 1.1
- 8,000 pages per month maximum duty cycle
- 3 year return to base warranty

7681 **$475**



FS-1020D

- Up to 20ppm A4
- Power PC 405 266MHz
- 600 x 600 dpi
- 16MB RAM (Max: 272MB)
- 10 seconds to print first page
- A4, B5, letter, legal paper sizes
- 50 + 250 sheet input
- Parallel + full speed USB 2.0
- 15,000 pages per month maximum duty cycle
- 2 year return to base warranty

Rent* $6.71/wk

2191 **$599**



FS-1920

- Up to 28ppm A4
- Power PC 405 266MHz
- 600 x 600 dpi
- 32MB RAM (Max: 288MB)
- 9.5 seconds to print first page
- A4, B5, A5, letter, legal paper sizes
- 100 + 500 sheet input
- Parallel + full speed USB 2.0
- 125,000 pages per month maximum duty cycle
- 2 year on-site warranty

Rent* $15.68/wk

2002 **$1,399**



FS-3830N

- Up to 33ppm A4
- PC 750 CX/300MHz
- 600 x 600 dpi
- 96MB RAM (Max: 576MB)
- 11.5 seconds to print first page
- A4, B5, A5, letter, legal paper sizes
- 100 + 500 sheet input
- Fast Ethernet 10/100 Base TX + Parallel + Hi-speed USB 2.0
- 175,000 pages per month maximum duty cycle
- 2 year on-site warranty

Rent* $20.83/wk

150 **$1,859**



FS-C5016N

- Up to 16ppm A4
- Power PC 750 CXe/400MHz
- 600 x 600 dpi
- 96MB RAM (Max: 608MB)
- 16 seconds to print first page
- A4, B5, A5, letter, legal paper sizes
- 100 + 500 Sheet input
- Network + Parallel + Full Speed USB 2.0
- 85,000 pages per month maximum duty cycle
- 2 year on-site warranty

Rent* $32.89/wk

843 **$3,207**

KYOCERA FS-1000/FS1010 - TONER KIT

A4532 **$135**

KYOCERA FS-3830N TONER 20,000 YIELD

N6559 **$175**

KYOCERA FS-1920 TK-55 TONER 15,000 PAGE YIELD

N2204 **$165**

KYOCERA FS-C5016N BLACK TONER 8000 PAGES

L5849 **$115**

KYOCERA FS-C5016N CYAN TONER 8000 PAGES

L5850 **$218**

KYOCERA FS-C5016N MAGENTA TONER 8000 PAGES

L5851 **$218**

KYOCERA FS-C5016N YELLOW TONER 8000 PAGES

L5852 **$218**

KYOCERA FS-C5016N COLOUR KIT WITH FREE BLACK TONER

L5853 **$635**

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COPIERS/MFP'S

KYOCERA COPIERS

KYOCERA

KM-2050 COPIER/ PRINTER + TONER



- Output Speed: Up to 20 ppm / Up to 10 ppm A3
- Resolution: 600 x 600 dpi
- First Copy Out Time: 20 second

Paper Handling Options
- Reverse automatic document feeder

Multifunctional Options
- Network scan system
- Fax / network fax system

Rent* $38.10/wk

R1151 **$3,839**

KM-1620 DIGITAL A3 COPIER



- Copy speed A4 16cpm
- Copy speed A3 8cpm
- Standard memory 32MB
- First copy out speed: 5.9 seconds
- 600 x 600 dpi 256 greyscale
- 300 sheet cassette+ 50 sheet bypass
- 50-200% zoom
- Warranty period 90 days parts only.

Rent* $23.21/wk

Q5698 **$2,245**

KM-1650 COPIER/PRINTER



Standard printer/network functionality

Paper Handling Options
- Reverse Automatic Document Feeder
- Job seperator

Multifunctional Options
- Network scan system
- Fax / network fax system

Rent* $32.42/

Q6548 **$3,16**

NEW BROTHER MFC PRINTERS

brother At your side.

BLACK INK CARTRIDGE

Q1657 **$29**

CYAN INK CARTRIDGE

Q1659 **$15**

MAGENTA INK CARTRIDGE

Q1660 **$15**

YELLOW INK CARTRIDGE

Q1661 **$15**

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MFC-210C 6 IN 1 INKJET FLATBED MFC



Inkjet Flatbed MFC with PhotoCapture Centre
- **Colour Printer** 20ppm mono, 15ppm colour 1200 dpi x 6,000 dpi optimsed. Up to 100 sheet capacity
- **Colour Flatbed Copier** 17cpm mono and 11cpm colour, 600 x 1200 dpi
- **Colour Flatbed Scanner** 600 x 2400 dpi
- **Colour fax** 14.4bps modem, dual access
- **Photo capture centre** smart media, compact flash, sony memory stick pro, secure Digital, XD Picture Card

Q1623 **$225**

MFC-620CN 8 IN 1 INKJET FLATBED NETWORK MFC



Inkjet Flatbed Network MFC with PhotoCapture Ce
- **Colour Printer** 20ppm mono, 15ppm colour 1200 6,000 dpi optimsed. Up to 100 sheet capacity
- **Colour Flatbed Scanner** 600 x 2400 dpi, 19,200 class interpolated
- **Colour fax** 14.4bps modem, dual access. Up to 1 page ADF
- **Photo capture Centre** smart media, compact flas sony memory stick pro, secure digital, xD Picture
- **Speaker Phone** telephone answering device
- **USB interface** optional wireless printer server ava

Q1625 **$34**

IE FUTURE IN IMAGING



KONICA MINOLTA PAGEPRO 1300W

RELIABLE PRINTING SOLUTION FOR USERS NEEDING TO PRINT A MULTITUDE OF PROFESSIONAL BUSINESS DOCUMENTS EFFICIENTLY

- Up to 16ppm A4
- 1200 x 1200 dpi FineART™
- First page Less than 13 seconds
- IEEE 1284 parallel
- Compatibility: Windows 98SE/ME/2000/XP

049 **$235**



KONICA MINOLTA MAGICOLOR® 2400W

DESKTOP COLOUR LASER PRINTER

Fast, small, light and easy to operate, this printer is a welcome addition to any team. The Magicolor 2400W is a cost effective colour printer that does not require special paper, unlike inkjets.

- 5ppm colour
- 20ppm black and white
- 2400 x 600 dpi,
- USB
- Windows Print System

Rent* $7.83/wk

208 **$699**



KONICA MINOLTA MAGICOLOR® 3300

GOOD UPGRADE TO FAST WORKGROUP COLOUR

The Magicolor® 3300 enables businesses to produce premium quality colour reports, presentations, spreadsheets and brochures with quality, speed and reliability they can depend upon.

- Print method electrophotographic laser
- Up to 24ppm monochrome & colour A4
- Up to 15ppm monochrome & colour A4
- Resolution 600 x 600 dpi full speed; 1200 x 1200 dpi half speed
- Maximum duty cycle up to 60,000 prints/month
- Windows 95/98/Me/NT4/2000/XP, Linux, Mac OS9x, OSX

Rent* $30.76/wk

301 **$2,999**



KONICA MINOLTA MAGICOLOR® 5430

COLOUR LASER PRINTER

With crisp and fast output, the Magicolor 5430 is the most innovative laser printer in its class. With over 30 brand new features, it is sure to impress any workgroup.

- 20ppm A4 colour or mono
- 64MB RAM
- 2400 x 600 dpi resolution
- A4, letter, legal page sizes
- USB, parallel and network interfaces
- First page print time 14.1 secs.
- GDI printing

Rent* $19.82/wk

495 **$1,769**

KONICA MINOLTA MAGICOLOR® 2300DL

NETWORKED COLOUR LASER



- Up to 4ppm in colour (A4), up to 16ppm mono (A4)
- Resolution 2400 x 600 dpi
- Standard interfaces - Ethernet (10/100BaseTX) supports TCP/IP; USB 1.1; IEEE 1284 Parallel

Rent* $9.40/wk

F7927 **$839**

KONICA-MINOLTA 2300 SERIES TONER 4,500 PAGE YIELD - BLACK

F8852 **$139**

KONICA MINOLTA MAGICOLOR 3300 TONER CARTRIDGE- BLACK

N5137 **$79**

KONICA MINOLTA MAGICOLOR 2400W TONER CARTRIDGE- BLACK

R0703 **$128**

KONICA MINOLTA MAGICOLOR 2400W TONER CARTRIDGE- MAGENTA

R0706 **$189**

KONICA MINOLTA MAGICOLOR 2400W TONER CARTRIDGE- YELLOW

R0704 **$189**

KONICA MINOLTA MAGICOLOR 2400W TONER CARTRIDGE- CYAN

R0707 **$189**

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MONO LASERJET PRINTER SERIES

HP LASERJET 9050 SERIES



- Prints up to 50ppm
- First page out - approximately 8 seconds
- 600 x 600 dpi with HP FastRes 1200, Resolution Enhancement technology (REt) and HP Ultraprecise toner
- 100-sheet multipurpose tray
- 64MB DDRAM (two available DIMM slots)
- Up to 300,000 pages per month duty-cycle
- Hi-speed USB 2.0 and IEEE

Rent* $60.25/wk

Q2899 **$6,769**

HP LASERJET 2430 SERIES



- Prints up to 33ppm
- 1200dpi REt & FastRes 1200 dpi
- 64MB RAM, expandable to 320MB
- 400MHz processor

HP LJ 2430T Rent* $18.48/wk

Q2891 **$1,649**

HP LJ 2430TN Rent* $24.53/wk

Q2892 **$2,189**

HP LJ 2430TDN Rent* $24.08/wk

Q2893 **$2,329**

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HP LASERJET 1320 SERIES



Fast desktop laser printer ideal for small business workgroup or SOHO users

- Prints up to 27ppm in A4
- Resolution: 1200 dpi
- First page out: 8.5 seconds
- 16MB RAM
- 193MHz Processor
- Interface: USB 2.0 port, IEEE 1284-B compliant parallel port

Rent* $8.17/wk

P9319 HP LJ 1320 **$729**

Rent* $10.07/wk

P9320 HP LJ 1320N **$899**

Rent* $12.20/wk

P9321 HP LJ 1320TN **$1,089**

HP LASERJET 4250 SERIES



- Up to 43 ppm in A4
- Resolution: 1200 dpi
- 500 sheet tray & 100 sheet multi-purpose tray
- Monochrome laser
- Two open industry-standard CompactFlash slots

Rent* $19.04/wk

Q3919 HP LJ 4250 **$1,699**

Rent* $23.67/wk

Q2900 HP LJ 4250N **$2,289**

Rent* $28.32/wk

Q2894 HP LJ 4250TN **$2,739**

Rent* $33.74/wk

Q2890 HP LJ 4250DTN **$3,289**

HP LASERJET 2420 SERIES



- Prints up to 28ppm in A4
- HP Fast & ProRes 1200 - true 1200 dpi at engine speed
- 32MB standard, expandable to 288MB
- Up to 75,000 pages per month duty cycle

Rent* $11.98/

Q4065 HP LJ 2420 **$1,06**

Rent* $14.00/

Q2887 HP LJ 2420D **$1,24**

Rent* $16.35/

Q2888 HP LJ 2420N **$1,45**

Rent* $18.48/

Q2889 HP LJ 2420DN **$1,64**

HP LASERJET 4345MFP SERIES



Ideal for SMB as it is a Workgroup device.

- **Print:** Up to 43ppm in A4
- First page out: 10 seconds.
- Resolution: 1200 dpi
- Easy to use touch screen control panel
- All new MFP devices now share a common contro panel.
- **Scan:** Up to 45cpm (letter)/43cpm (A4)
- **Copy: Resolution enhanced 600x600dpi**

Rent* $40.95/

R0332 HP LJ 4345MPF **$41**

ASER PRINTERS

? COLOR LASERJET 50 SERIES



o to 28ppm (A4)
0 x 600 dpi with hp ImageREt 3600
0MB RAM
3MHz processor
0 sheet multipurpose tray & 500 sheet tray
0,000 duty cycle
arallel & USB connectivity

Rent* $59.98/wk

2214 HP Color LJ 5550 **$6,739**

Rent* $67.46/wk

2215 HP Color LJ 5550DN **$7,579**

Rent* $78.81/wk

2217 HP Color LJ 5550DTN **$9,399**

HP COLOR LASERJET 4650 SERIES



- Up to 21ppm colour and black & white
- 160MB RAM
- 600 x 600 dpi with HP ImageREt 3600
- 100 sheet multipurpose tray and 500 sheet input tray
- 533 MHz RISC processor
- 85,000 pages per month

Rent* $33.73/wk

N5949 HP Color LJ 4650 **$3,399**

Rent* $40.41/wk

N6043 HP Color LJ 4650DN **$4,099**

Rent* $52.83/wk

N6044 HP Color LJ 4650DTN **$5,725**

COLOR LASERJET 50 SERIES



$150 cashback via redemption See website for details

to 19ppm A4 mono and up to 4ppm A4 colour
MB built-in SDRAM
0 x 600 dpi with HP ImageREt 2400
,000 pages per month
ont control panel lets you check printer supplies and tus at a glance

Rent* $12.09/wk

5031 HP Color LJ 2550LN **$1,079**

Rent* $15.68/wk

5032 HP Color LJ 2550N **$1,399**

HP COLOR LASERJET 3550 SERIES



- Up to 16ppm colour and black & white
- 600 x 600 dpi with HP ImageREt 3600
- 64MB RAM
- 533 MHz RISC processor
- 45,000 pages per month

Rent* $19.67/wk

Q3133 HP Color LJ 3550 **$1,755**

Rent* $23.86/wk

Q3134 HP Color LJ 3550N **$2,129**

HP DESKJET 450WBT MOBILE PRINTER



- Battery and Bluetooth card included
- 9ppm in black & 8ppm in colour
- 45-page sheet feeder
- 1200 dpi black & up to 4800 x 1200 optimised dpi colour (PhotoREt 4)
- HP PCL 3 enhanced
- Window and MAC compatible

N5950 **$499**

HP BUSINESS INKJET PRINTER 1200D



- Up to 28ppm black & up to 8ppm colour in fast mode
- Up to 1200 x 1200 dpi black & 4800 x 1200 optimised dpi colour
- 32MB RAM
- Automatic two sided printing

HP BUSINESS INKJET 1200d

P9268 **$349**

HP BUSINESS INKJET 1200dtn

P9274 **$529**

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HP DESKJET & OFFICEJET SERIES

HP DESKJET 3745



Compact and reliable colour inkjet printer ideal for home use
- Up to 4800 optimised dpi
- Up to 1200 x 1200 dpi black
- Up to 10ppm black
- Up to 14ppm in colour
- 80-sheet input tray, 50-sheet output tray
- A6 borderless

Q1872 **$75**

HP DESKJET 4255 ALL-IN-ONE



Ultra compact all-in-one : print, fax, scan, copy and phone in one small machine
- Up to 17ppm in black, up to 1200 x 1200 dpi
- Up to 12ppm in colour, up to 4800 x 1200 optimised dpi colour & 1200-input dpi
- Scan Quality up to 36-bit colour
- Fax Transmission 33.6 Kbps;

N8513 **$224**

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HP PSC 1315 ALL IN ONE PRINTER



- **Print**: up to 17ppm black,12ppm colour up to 4800 x 1200 optimised dpi
- **Scan**: up to 600 x 2400 dpi HW
- **Copy**: 600 dpi mono, up to 1200 x 1200 dpi colour

P7035 **$149**

HP OFFICEJET 2355 ALL-IN-ONE



- **Print**: up to 23ppm black,18ppm colour
- Up to 4800 optimised dpi
- **Scan**: up to 1200 x 4800 optical resolution, 48-bit colour
- **Copy:** up to 23ppm black,18ppm colour
- Borderless A4 photo printing
- View, edit and print photos with or without a PC
- Front Pictbridge port and digital media card slots

Q2901 **$349**

HP OFFICEJET 2710 ALL-IN-ONE



- **Print**: 30ppm black, 20ppm colo
- Up 4800 optimised dpi
- **Fax**: 33.6kbps fax modem
- **Scan**: up to 2400 x 4800 optica resolution, 48-bit colour
- **Copy:** up to 30ppm black, 20pp colour
- Borderless A4 photo printing
- Wired ethernet and wireless 802.11g networking built-in

Rent* $7.16/

Q2903 **$63**

HP DESKJET 6840 COLOUR INKJET PRINTER



- Up to 30ppm black, 20ppm colour
- Up 4800 optimised dpi
- Automatic two-sided printing
- Auto paper type sensor
- Borderless A4 photo printing
- Front Pictbridge port
- Wired ethernet and wireless 802.11g networking built-in

Q2904 **$379**

HP OFFICEJET 7410 ALL-IN-ONE



- **Print:** up to 30ppm black, 20ppm colour
- **Fax:** 33.6kbps fax modem
- **Scan:** up to 2400 x 4800 optical resolution, 48-bit colour
- **Copy:** 30ppm black, 20ppm colour
- Wired ethernet and wireless 802.11g networking bu
- Automatic two-sided printing and 50 sheet ADF
- 400 sheet total paper capacity

Rent* $9.29/

Q2905 **$82**

PRINTERS & SOFTWARE

P CONSUMABLES

LASERJET NT CARTRIDGE, 1010 PRINTER SERIES



612A
d 2,000 based on 5% coverage

381 **$99**

HP 56A BLACK INKJET CARTRIDGE TWIN PACK



C6656AA

M4800 **$49**

HP 57 TRICOLOR INKJET CARTRIDGE AP



C6657AA

F9886 **$49**

96 AP BLACK NT CARTRIDGE



67WA

677 **$48**

HP 94 AP BLACK PRINT CARTRIDGE



C8765WA

Q1680 **$33**

HP 95 AP TRICOLOR PRINT CARTRIDGE



C8766WA

Q1676 **$39**

hp invent

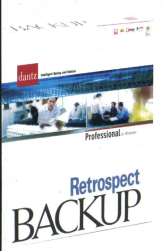
HP ORIGINAL REWARDS

HP Original Rewards is an exciting program from HP that rewards you for purchasing (and recycling) HP LaserJet Print Cartridges, Inkjet Cartridges and HP Paper. Simply sign up now and you will receive rewards points for every purchase invoice you send in.

Register now at
www.hp.com/au/originalrewards

ANTZ RETROSPECT 6.5 FOR WINDOWS

Software



Dantz® Retrospect® 6.5 for Windows provides complete protection for file servers, desktops, notebooks, and business-critical applications.

RETROSPECT PROFESSIONAL - Designed for home and small office users who want to protect a single Windows computer and up to two additional networked Windows or Macintosh desktops and notebooks by backing them up to a Windows-based computer.

RETROSPECT SINGLE SERVER* - Designed for small or midsize businesses with a single server. Runs on Microsoft Windows, Macintosh and backs up and restores a single file server or business-critical application server, as well as desktops and notebooks running Windows, Macintosh and selected Unix-based operating systems.

RETROSPECT SMALL BUSINESS SERVER* - Backs up and restores a single server running Windows Small Business Server, as well as networked desktops and notebooks running Windows, Macintosh, and selected Unix based operating systems. Includes exchange agent, SQL Server agent and server disaster recovery for the Small Business Server computer.

RETROSPECT MULTI SERVER* - For small to midsize businesses with several Microsoft Windows servers. Backs up and restores computers running on Windows, Macintosh, and selected Unix operating systems.

589 DANTZ RETROSPECT PROFESSIONAL 6.5 **$199**

602 UPGRADE FROM R/DESKTOP V5.5/5.6 OR PRO 6 **$125**

dantz

ADD-ON PRODUCTS:

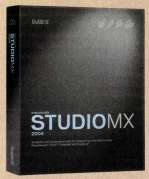
- EXCHANGE SERVER AGENT
- SQL SERVER AGENT
- ADVANCED TAPE SUPPORT
- OPEN FILE BACKUP
- PROACTIVE BACKUP
- DISASTER RECOVERY

*CALL 1300 13 9999
FOR LATEST PRICING

PLEASE NOTE:
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MACROMEDIA DIRECTOR MX 2004 AND CAPTIVATE

MACROMEDIA STUDIO MX 2004



Studio MX 2004 provides professional functionality for every aspect of web development, all in one integrated package. Developers can build websites and applications with Dreamweaver, create interactive content with Flash, generate web graphics with Fireworks, and incorporate vector graphics with FreeHand. For developers delivering rich interactive applications, Studio MX 2004 is also available with Flash MX Professional 2004. Studio MX 2004 with Flash Professional includes everything in Studio MX 2004 plus the advanced capabilities of Flash MX Professional 2004.

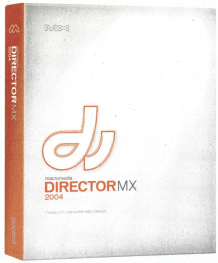
STUDIO MX 2004 INCL. FLASH MX PROFESSIONAL 2004 WIN/MAC
K8904 **$1,499**

STUDIO MX 2004 INCL. FLASH MX 2004
K8903 **$1,349**

UPGRADE FROM STUDIO MX TO STUDIO MX 2004 INCLUDING FLASH 2004
L1535 **$660**

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MACROMEDIA® DIRECTOR MX 2004

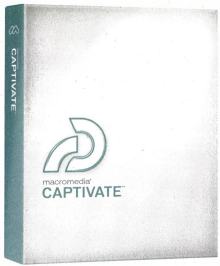


Author once and deploy anywhere with Director MX 2004, the proven multimedia tool for building rich, interactive content and applications for CDs, DVDs, kiosks, and the Internet. Director MX handles the widest variety of media, letting you build compelling, high-performance content—such as learning applications, corporate demonstrations, and games that delivers measurable results.

Customise your applications with Director's extensib plug-in architecture and ensure smooth playback, even when using long files or videos, with Director's advanced memory management. Director MX offers powerful new features including a choice of scripting languages, DVD-video support, cross-platform publishing, and Flash MX 2004 integration.

M5542	FULL	$1,87
M5910	UPGRADE	$62

MACROMEDIA® CAPTIVATE



Macromedia Captivate (formerly RoboDemo) automatically records all onscreen actions and instantly creates an interactive Flash simulation. Point and click to add text captions, narration, and e-learning interactions without any programming knowledge.

Macromedia Captivate lets anyone record on-scree activity to create software simulations and product demonstrations. The result is an editable "show me" movie or demonstration complete with audio narrati animations, text captions, and highlights. Captivate can also instantly generate customisable software simulations with scored interactivity and instructiona feedback.

Q5983	FULL	$69
Q5984	UPGRADE^	$42

^Upgrade from Robo Demo 5, Robo Demo E-Learning edition 5, Robo Demo 4, Robo Demo E-Learning edition 4

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Creating a single drawing as efficiently as possible is important. Delivering a coordinated set of drawings in a timely manner directly benefits your bottom line. With AutoCAD 2005 you can do both. Everyday tools like the table object and tool palettes boost productivity, and the new Sheet Set Manager helps you control content across entire sets of related drawings, enabling you to lower the risk for errors. Then, in a single view, you can compose and collate sheet sets and share them with your project team using plots, eTransmit, or DWF™ (Design Web Format™) files.

N0571 **$5,999**



AUTOCAD LT® 2005

With AutoCAD LT 2005 you can easily create, plot, publish, and share your 2D designs. You get more done in fewer steps with a streamlined plotting interface and drafting features that boost your productivity.
Quickly create tables, better manage large groups of layers, and conveniently access frequently used content to work more efficiently. Sharing your data widely is a snap: even team members without AutoCAD LT software can view and mark up your published DWF™ files, and you can instantly distribute multiple DWG files in a single step. Plus background plotting frees you to work while you print out your drawings.

N0569 FULL **$1,950** | N0570 UPGRADE* **$639**

***UPGRADE FROM LT2000i/2002/2004**



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Volo View 3 software is a cost-effective, easy-to-use, digital design viewing solution that lets everyone on your team electronically review, mark up, measure and plot AutoCAD and Autodesk Inventor™ based drawings. Upgrades also available.

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AUTOSKETCH® 9

AutoSketch 9 software provides a comprehensive set of CAD tools for creating precision drawings - from electrical details to floor plans, from conceptual sketches to product specifications, and much more.
AutoSketch 9 provides: Comprehensive CAD tools for creating expert-quality drawings • Straightforward drafting in a Windows XP - like environment • Tutorials and wizards for a fast start.

P7266 **$199**



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A comprehensive library of Autodesk Symbols covering both Architectural and Engineering services. Simply drag and drop from a toolbar-style graphical interface directly into your AutoCAD drawings.
Autodesk Symbols 2000 Architectural - Contains over 5,600 symbols for building design and documentation.
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SOFTWARE

LEGRAND CRM SOFTWARE - VERSION 4

Legrand CRM Software

STANDARD EDITION
- Account & Contact management
- Mailing list management
- Mail merge using Microsoft Word
- Group Calendar & Tasks
- Microsoft Outlook interface
- Marketing Campaigns & Events
- Sales Opportunities
- User Login control
- **No optional modules available**

PROFESSIONAL EDITION

Standard edition features plus
- Enhanced User Rights
- Personalised Email
- 'Lapsed Customer' reporting
- Multi-value Quicksearch
- TAPI support

Optional modules available:
- Customer Service module
- Item Tracking module
- Direct accounting interface into selected accounting systems.

AUSTRALIA'S FINEST CUSTOMER DATABASE MANAGEMENT SOFTWA



Legrand CRM is an Australian-developed, Customer Relationship Management (CRM) solution that is both powerful and easy to use. Powerful yet practical, functional yet affordable, Legrand CRM is the ideal customer database management solution for workgroups and smal businesses. If you are determined to grow your customer base, strength your existing customer relationships and effectively manage your sales t then you need to look at Legrand CRM. You will not find another system that is as practical and effective.

The centralised database is easily shared by all staff members in the offi All customer information is right at everyone's fingertips, thereby ensurin that everyone in the office is fully informed on all customer communicatio and activities. A robust data synchronization routine enables laptop use to operate a local database which they can synchronise with the main da over the office LAN.

Legrand CRM is available in different Editions to meet your size and functionality. The optional accounting interfaces (purchased seperately f use with Professional edition only) enable you to exchange information v several accounting systems, including selected Quickbooks and MYOB configurations.

STANDARD EDITION

Q0314	SINGLE USER	$27

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ALWAYS STAY ON TOP OF YOUR BUSY SCHEDULE

ACT!

ACT! 7 FOR WORKGROUPS

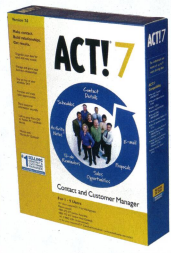


ACT! 7 for Workgroups is designed for multiple users.

Q0470 FULL **$489**

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ACT! 7 HELPS SELLING PROFESSIONALS AND SMALL BUSINESSES MAKE CONTACT, BUILD RELATIONSHIPS AND GET RESULTS.



* ACT! Link to Pocket PC, ACT! for Palm OS , Accounting Integration Links and ACT! for Web software is sold separately.

ACT! 7 helps you:
- Gain greater customer insights by instantly accessing, organising and managing contact details.
- Manage your time more efficiently by quickly filtering, tracking and completing calls, meetings and to-do items.
- Take important information wherever you go by easily integrating with Palm OS® and Pocket PC handheld devices.*
- Improve your bottom line by better forecasting, tracking and reporting sales opportunities.
- Share data by easily importing and synchronising data from ACT! and other sources.

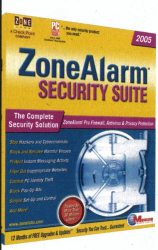
Integrates with Microsoft Outlook
- Import contact, calendar, to-do items, and other information from Outlo
- Access your Outlook Inbox and other folders within ACT! e-mail.
- Save messages that have been sent and received in Outlook to an AC contact record.

Intergrates with Popular Accounting Software*
- Reduce duplicate data entry, quickly synchronise contact details betwe ACT! and your accounting system.
- See accounting details of your customers/suppliers within ACT!'s accounting tab - from invoices, credit information, order information an much more.

Q0429	FULL VERSION	$28

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  Stops viruses and worms, and protects against emerging viruses before they attack.
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  Keeps personal data private and secure, deletes ad-ware cookies, blocks pop-up ads, and more.
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  Quarantines suspicious email attachments and blocks outbound messages containing potential viruses.
- **Content & Communication Protection**
  Protects users of the most popular IM services and shields you from IM spammers, thieves, and online predators. Blocks access to offensive web site content.

6012 **$99**

ZoneAlarm®



ZONEALARM PRO 5

- Stop hackers and cybercriminals
- Monitor inbound/outbound email activity
- Safeguard personal information
- Combat PC identity theft
- Simple set-up and control

P9251 SINGLE USER **$79**

P9249 5 USER **$299**

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THE IDE FOR WINDOWS THAT WILL TAKE YOU PLACES YOU'VE NEVER BEEN, FASTER THAN YOU EVER THOUGHT POSSIBLE.

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- Speed through Windows development with all the languages and SDKs you need in one seamless RAD environment
- Build higher-quality applications easier with new productivity and perform ance technologies
- Scale-up development performance, quality, and software reliability with synergistic application lifecycle tools
- Delphi 2005 lets you continue to develop and maintain existing Win32 applications while simplifying the path to the Microsoft .NET Framework and next-gen Windows applications, in one integrated IDE

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Ideal for individuals building Web and GUI applications for .NET and Win 32.

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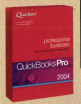
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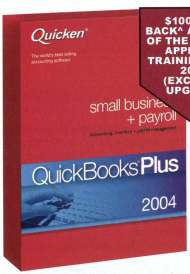
QUICKEN CASHBOOK 2004

Managing your business and organising your home finances is easy with Quicken CashBook 2004. A ho and business software solution, CashBook lets you manage your investments, loans and bank accounts as well as keeping an eye on your financial position. The business accounting tools cover everything from estimates and invoices, to bill payments and accoun receivable - everything a small business needs.

Quicken CashBook makes it easy to see your financ position at a glance with graphs and reports. Your finances are accessible from 'Centres' like the 'Bank Centre' or 'Business Centre' so the information you together is kept together. It's the easy way to work w your accounts.

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QuickBooks Plus 2004 offers essential employee related accounting tools

- Easy-to-use tools to help manage your payroll
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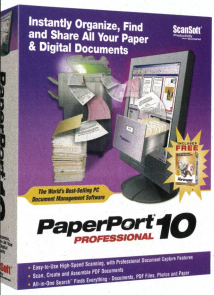
Gives you easy-to-use tools and the latest tax tables you need to help manage and maintain control of yo payroll.

Once you get started, QuickBooks Plus has over 100 reports and graphs providing an overview of your business at any time. When you need in-depth information, you can navigate between financial det and a summary report in just one click.

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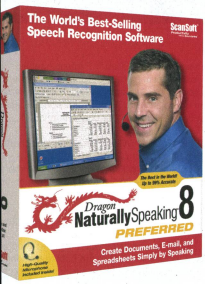
Get Sorted with the industry standard in desktop document management. The latest edition of PaperPort Professional helps you easily organise, find and share your paper and digital documents.

PaperPort Professional 10 is the most productive and cost effective way for everyone in your office to organise, find and share paper and PDF documents. PaperPort Professional combines the efficiency of document management, the convenience of network scanning and the power of creating PDFs, to bring a new level of operational proficiency to your organisation. Millions of users rely on its All-in-One Search to quickly find important documents, and its visual document desktop to organise and assemble documents with drag & drop ease - just as if they were paper.

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Create documents, spreadsheets and e-mail - all by speaking! Talk to your computer and your words instantly and accurately appear in Microsoft® Word and Excel®, Corel® WordPerfect® and virtually all Windows®-based applications. Listen to incoming e-mail and documents read aloud. Search the Web by speaking URLs and links.

WHAT'S NEW IN DRAGON NATURALLYSPEAKING 8?

Specially designed for Australian speech, Dragon NaturallySpeaking 8 is more accurate than ever before. Achieve outstanding accuracy levels of up to 99%.

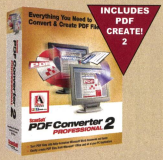
GET STARTED FASTER!

Dragon NaturallySpeaking learns to recognise your voice in fewer than five minutes, and gets better the more you use it!

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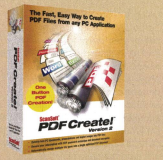
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A bundle of ScanSoft PDF Create! and PDF Converter, PDF Converter Professional 2 significantly improves office productivity providing business professionals with the ability to more seamlessly move between the two dominant electronic document formats - Microsoft Word and PDF.

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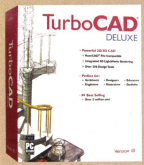
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TurboCAD® Deluxe puts advanced CAD capabilities within everyone's reach! Easily access over 250 2D/3D precision design tools to create professional quality sketches, drawings, and 3D surface models. Work in a familiar Windows® - like environment to quickly draft and design home plans, technical drawings, solid models, artistic illustrations and more.

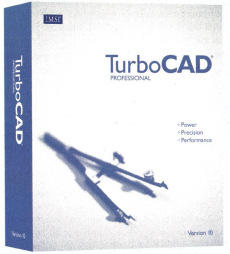
Using the Step-By-Step Wizard, TurboCAD® Deluxe will help you set up your drawing size, scale, and all settings automatically. The Associative Dimensioning tools allow you to insert any type of dimension in one step. You can even create multiple dimensions simultaneously with the new Quick Dimension tool. When you change objects, the associative dimensions will automatically adjust to the change!

Perfect For:
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- Engineers
- Designers
- Illustrators
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TurboCAD® Professional version 10.0 achieves new levels of power and performance. Using the new HDRI (High Dynamic Range Radiance Imaging) and LightWorks® 7.3 rendering engine for more accurate and photorealistic lighting, rendering performance is up to 40% faster than previous releases. The new version also includes an updated version of Spatial's 3D ACIS® R11 solid modelling engine, improving the solid modelling performance by up to 25% over prev releases.

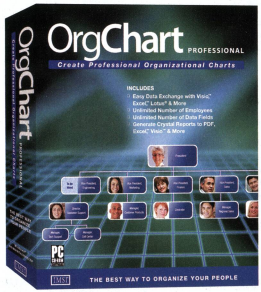
SOME ADVANCED FEATURES INCLUDE:
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- Class leading design and presentation tools
- Use of 2D tools while in rendered mode
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^Full Working version - No Student ID required.

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P2292 ACADEMIC^ **$2**

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This new version of OrgChart™ Professional sets th standard for organising your company's people and departments. By combining an intuitive design with a powerful database, OrgChart Professional enable anyone to create dynamic org charts in minutes.

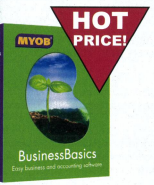
CREATE
- Smart Chart Creation Wizard produces org charts direct from files in minutes
- Import from Visio, Excel, Orgplus, Lotus and more
- Use professionally designed templates for high-im high quality charts

MANAGE
- Develop new databases automatically during cha creation
- Update, add data and fields with drag-and-drop e
- Keep pace with changes through built-in tracking, analysis and planning tools

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- Compile charts, analysis, data into pre-defined or customised report formats
- Publish org charts in any Microsoft® Office docum presentation, application or Web page
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N1794 **$1**

ONUS OFFERS WITH THESE MYOB PRODUCTS!



MYOB BUSINESSBASICS

MYOB BusinessBasics is a great place to start. You've probably been running some of your business on computer already - keeping track of income, expenses and GST in a spreadsheet, or issuing your tax invoices from a word processing program. Well BusinessBasics brings all of your basic business functions together in one easy-to-understand application.

- Track your GST and automate your BAS
- Automatically reconcile your accounts
- Generate over 70 reports
- Customise to suit your needs
- Print, fax, email or web
- Setup and manage promotions
- Facilitate effective backups

G4153 **$99**



MYOB ACCOUNTING V14

MYOB Accounting is for businesses that need to streamline accounts procedures and would benefit from improved inventory management, better management of customer and supplier relationships and advanced business reporting.

- Manage your sales, receivables and GST obligations
- Track your purchases and payables
- Store all your business contacts' information
- Keep track of your inventory
- Analyse your business
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N4708 FULL **$279** | N4711 UPGRADE **$229**



MYOB ACCOUNTING PLUS V14

MYOB Accounting Plus comes with an award winning integrated payroll, MYOB Accounting Plus is the ideal single-user business management and accounting solution for smaller employers. MYOB Accounting Plus also makes it easy to track and charge for your time, and provides access to powerful profit-building information about your business.

- Handle all your staff's needs with an award-winning integrated payroll
- Bill for your time the way you want to
- Manage all your sales and purchases
- Analyse your business
- Access M-Powered Services

N4713 FULL **$495** | N4715 UPGRADE **$269**



MYOB PREMIER V8

MYOB Premier is for businesses that need to streamline accounts procedures, whether through simplifying complex inventory issues, running an automated payroll, time billing, accessing advanced reporting or increasing productivity with multi-user access.

- Multiple users can access your business information simultaneously over your network
- Includes 12 months of support access and upgrades
- Integrated banking, sales, purchases, payroll and time billing
- Record and track foreign-currency transactions
- Powerful inventory and pricing features
- Access M-Powered Services

N4716 **$1,369**

MYOB RETAILMANAGER 7



The complete retail picture including 12 months of 7-days-a-week support and upgrades. With MYOB RetailManager it is easy to keep track of every transaction in your store from sales, stock movements, GST and gross profit, right through to staff performance and even customer details.

- Process sales fast
- Build profitable customer relationships
- Always know what's selling, what's not, what's on hand
- Streamline your stocktaking
- Manage your stock
- Setup and manage promotions
- Backup and Restore Process
- RetailManager Security

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PROMOTION TERMS & CONDITIONS:
Microsoft bonus offer only applies to purchases of full products (excluding upgrades and OEM's) made between 21 January 2005 and 13 March 2005. Microsoft Optical Desktop 3 and Microsoft Desktop Elite are keyboard and mouse bundles. All Microsoft redemption forms must be downloaded from www.myob.com.au/offers/BTW2005 and mailed to: **MYOB BTW Offer 2005, PO Box 371 Blackburn VIC 3130** Completed redemption forms must be received by MYOB no later than last mail 31 March 2005. All Microsoft redemption forms must be fully completed and accompanied by a proof of purchase (an original or copy of your receipt). **Limit of one Microsoft bonus product per full product purchased by a customer.** For full terms & conditions visit www.myob.com.au/offers/btw2005

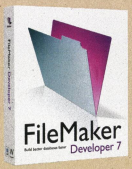
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FileMaker

EFFORTLESSLY MANAGES ALL YOUR INFORMATION

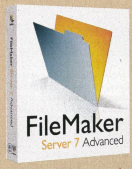
^Purchase FileMaker Pro 7 between 1st January 2005 and 25th March 2005, and get three great FileMaker Apps worth over $360 if you register your product online. FileMaker Meetings, Tasks and Work Requests are ready-to-use fully featured applications created by FileMaker to work hand-in-hand with FileMaker Pro 7. For full details visit http://www.filemaker.com.au/promos.
*Bonus application valued at $366, based on FileMaker sell price as at 6 January 2005.

FILEMAKER DEVELOPER 7



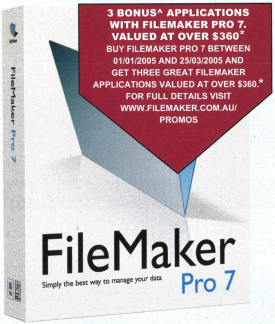
N0478 FULL **$835**

FILEMAKER® SERVER 7 ADVANCED



P9697 FULL **$4,220**
R2568 VLA LICENCE# **$4,350**

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FILEMAKER® PRO 7

FILEMAKER PRO 7 IS THE EASIEST-TO-USE, MOST-CUSTOMISABLE, NEW VERSION OF FILEMAKER EVER.

FileMaker® Pro 7 database software is simply the fast easiest way to effortlessly manage, people, projects, images and information.

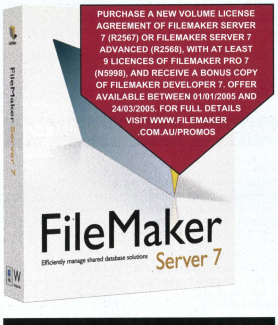
With over 100 new features, FileMaker Pro 7 is the be way to be instantly productive, while sharing your dat securely with your whole work group.

FileMaker® Pro 7 helps you organise, manage and share all of your data regardless of file type, so you c uncover critical business information and turn your id into productive, creative and customised solutions.

NEW FEATURES INCLUDE
- Visual tool for managing relationships
- Multiple views in different windows
- Store any file type in FileMaker Pro 7
- Multiple tables per file
- Improved Instant Web Publishing
- New sophisticated security model

N0476 FULL **$460** | N0477 UPGRADE **$22**

N5998 VLA LICENCE TIER 1 10-24 USERS **$43**



FILEMAKER SERVER 7

FileMaker Server 7 is high-performance server softw that efficiently manages shared database solutions. With ease-of-use breakthroughs in sharing and administration as well as advanced security features, FileMaker Server 7 gives you easy-to-use, yet powe features that allow you to:

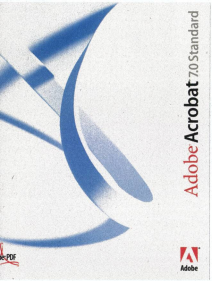
- Share databases with 2 to 250 users
- Improve the performance of peer-to-peer database sharing
- Host massive amounts of data
- Administer databases locally or remotely
- Protect your data with additional security features
- Share databases with 2 to 250 users
- Support large workgroups of more than 250 users,
- Use in a mixed-platform environment by allowing access to shared files through either Windows or M OS versions of FileMaker Pro 7.
- Improve the performance of peer-to-peer database sharing

N6744 FULL **$1,699** | R2567 VLA LICENCE# **$1,76**

#VLA licence price includes 1 year of maintenance.

OBE ACROBAT 7.0!

OBE ACROBAT 7.0 STANDARD



TRANSFORM PDF FILES INTO INTELLIGENT DOCUMENTS

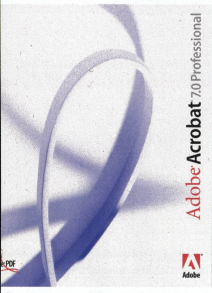
Adobe® Acrobat® 7.0 Standard software is the quick and easy way to create and share Adobe PDF documents. You can convert files from applications such as Microsoft Office into Adobe PDF documents that can be read by anyone using free Adobe Reader® software. Combine spreadsheets, presentations, images, and other files into a consolidated Adobe PDF document that others can read but not alter. Offer reviewers familiar commenting tools to quickly gather input. View comments and feedback from multiple reviewers, and then generate an Adobe PDF file with advanced security features that accurately represents the original document.

PRODUCT HIGHLIGHTS

- Create and share documents quickly and easily
- Combine different files to create an organized document
- Use familiar tools for review and commenting
- Protect document content to help preserve its integrity

824 WIN **$465** | Q7825 MAC **$465**

OBE ACROBAT 7.0 PROFESSIONAL



COLLECT, PRODUCE, AND SHARE INTELLIGENT DOCUMENTS

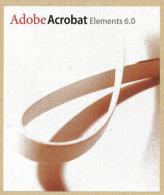
Adobe® Acrobat® 7.0 Professional software is the advanced way to create, control, and deliver more secure, high-quality Adobe PDF documents. Assemble electronic or paper files even Web sites, engineering drawings, and e-mail into reliable PDF documents that are easy to share with others using free Adobe Reader® 7.0 software. Manage document reviews, synthesising feedback from multiple reviewers while preserving document format and integrity. Extend commenting capabilities to anyone using Adobe Reader 7.0. Windows® users can design intelligent Adobe PDF forms that include business logic, such as calculations and data validations, to help increase the accuracy of data collection while reducing the costs of manual data entry.

PRODUCT HIGHLIGHTS

- Create and reliably exchange content-rich documents
- Assemble multiple files into a single, polished document
- Collect and manage review feedback
- Apply advanced document access controls and security

822 WIN **$689** | Q7823 MAC **$689**

ADOBE® ACROBAT® ELEMENTS



5 TOP REASONS TO BUY ADOBE® ACROBAT® ELEMENTS*

MINIMUM ORDER REDUCTION
The minimum number of seats per licensing order has been reduced from 1000 seats to 100 seats.

EASILY CREATE ADOBE PDF FILES
Create Adobe PDF files with drag-and-drop ease or with the click of a button from Microsoft Offce applications.

DISTRIBUTE FILES ELECTRONICALLY
E-mail compact Adobe PDF files to colleagues, clients, and vendors, speeding distribution and saving time and money on printing and delivery fees.

VIEW AND PRINT RELIABLY
Preserve the visual integrity of business documents so that they display and print correctly on a variety of platforms.

USE A DE FACTO STANDARD
Produce Adobe PDF files that can be viewed with the widely available Adobe Reader® software.

P4316 WIN LICENCE **$60***

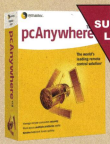
*Minimum order of 100 licences required. May require purchase of media kit.

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symantec™

SMALL BUSINESS SOLUTIONS

PCANYWHERE V11.5



Symantec pcAnywhere™, with powerful file transfer, robust security, strong remote management tools, and a new suite of features for increased accessibility, performance, and security that make it easy for helpdesk and IT personnel to resolve server and workstation problems.

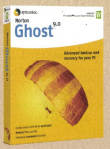
V11.5 HOST AND REMOTE

Q6649 **$259**

V11.5 HOST ONLY (INCL.1 REMOTE) 5 PACK

Q6650 **$549**

NORTON GHOST 9.0



Norton Ghost 9.0 is developed with Drive Image™ Technology - this new technology allows users to take advantage of key features such as hot imaging, incremental backups, automatic backups and creating drive letters for images.

Q0030 **$125**

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AREAS OF PROTECTION	Symantec AntiVirus™ 9.0	Symantec AntiVirus™ 9.0 with Groupware Protection	Symantec™ Client Security 2.0	Symantec Client Secur 2.0 with Groupware Protection
DESKTOP/REMOTE PC				
REMOVES VIRUSES, WORMS, AND TROJAN HORSES AUTOMATICALLY	●	●	●	●
DETECTS CERTAIN NON-VIRUS THREATS SUCH AS SPYWARE	●	●	●	●
STOPS WORMS FROM SPREADING THROUGH EMAIL	●	●	●	●
PROTECTS COMPUTERS FROM HACKERS WITH A DESKTOP FIREWALL			●	●
BLOCKS INTERNET ATTACKS WITH INTRUSION DETECTION			●	●
NETWORK SERVER				
REMOVES VIRUSES, WORMS, AND TROJAN HORSES AUTOMATICALLY	●	●	●	●
DETECTS CERTAIN NON-VIRUS THREATS SUCH AS SPYWARE	●	●	●	●
INCLUDES A CENTRALISED CONSOLE TO INSTALL, UPDATE, AND RESPOND	●	●	●	●
MICROSOFT EXCHANGE/ LOTUS DOMINO SERVERS				
REMOVES VIRUSES, WORMS AND TROJAN HORSES IN EMAIL		●		●
FILTERS SPAM AND UNWANTED EMAIL CONTENT		●		●
PART	N7808	N7790	N7770	N7776
5 USER	$399	$549	$499	$699
PART	N7809	N7793	N7771	N7799
10 USER	$749	$989	$919	$1,279
PART	N7810	N7795	N7772	N7800
25 USER	$1,599	$2,219	$2,069	$2,899

05 VERSIONS AVAILABLE NOW



GREAT VALUE BUNDLE!

Symantec Norton SystemWorks™ 2005 Premier gives you powerful tools to solve PC problems and protect data. This easy-to-use suite helps you eliminate viruses, back up your files, and prevent computer problems. A new recovery disk allows you to recover data even when Windows won't start up. **Includes full version of Norton Ghost 9.0.** Norton Ghost 9.0 is developed with Drive Image™ Technology - this new technology allows users to take advantage of key features such as hot imaging, incremental backups, automatic backups and creating drive letters for images.

R0242 BUNDLE PRICE **$189**



GREAT VALUE BUNDLE!

Symantec Norton SystemWorks™ 2005 is the smartest way to solve computer problems and protect your valuable data. This easy-to-use software helps you eliminate viruses, prevent computer problems, and restore your system to a healthy state. The improved One Button Checkup makes it easier than ever to find and fix computer problems.

R0231 BUNDLE PRICE **$159**

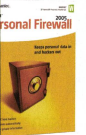


NORTON INTERNET SECURITY™ 2005**

Symantec's Norton Internet Security™ 2005 provides essential protection from viruses, hackers, and privacy threats. Norton AntiVirus™ is the world's most trusted antivirus solution*. Norton™ Personal Firewall keeps personal data in and hackers out. And Norton™ Privacy Control, Norton AntiSpam™, and Norton™ Parental Control safeguard you and your family from other common online risks.

Q0503 SINGLE USER **$129** | Q0504 3 USER **$189**

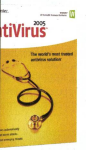
R1942 5 USER **$289**



NORTON PERSONAL FIREWALL 2005

Symantec's Norton™ Personal Firewall 2005 keeps personal data in and hackers out. Right out of the box, it makes your PC invisible on the Internet so that hackers can't find it. And easy-to-use privacy controls prevent personal information from being sent out without your knowledge.

Q0426 SINGLE USER **$89** | Q0427 5 USER **$189**



NORTON ANTIVIRUS 2005

Symantec's Norton AntiVirus™ 2005 is the world's most trusted antivirus solution.* It removes viruses, worms, and Trojan horses automatically - without interrupting your work. New Norton™ Internet Worm Protection blocks certain more sophisticated worms (such as Blaster and Sasser) before they enter your computer. Norton AntiVirus can also detect spyware and other non-virus threats.

R0208 SINGLE USER **$89** | R2137 3 USER **$125**

P9629 5 USER **$189**

* Top-selling antivirus software product from December 2000 through March 2004 based on The NPD Group's retail Top Selling Business Software list.

NORTON GOBACK 4.0



Restore your PC to a healthy state by going back minutes, hours, or even days (depending on available disk space). Also use Norton GoBack to restore files that have been deleted or modified, and to try new software safely.

Q0036 **$65**

SYSTEMWORKS REBATE OFFER

^TERMS & CONDITIONS:
Between 17 January 2005 and 31st March 2005, purchase any Norton Systemworks 2005 Premier and Norton Personal Firewall 2005 Standard Edition Bundle and receive a bonus $70 AUD/ NZD rebate. Purchase any Norton Systemworks 2005 and Norton Personal Firewall 2005 Standard Edition Bundle and receive a bonus $50 AUD/NZD rebate. Rebate offers are redeemable from Symantec. This offer is not valid with the Spider-Man 2 Christmas promotion featured in the December catalogue.

For full terms & conditions please see: **www.symantec.com.au/ region/au_nz/promo/**

#Proof of valid student status (of the purchaser) must be provided in order to qualify for this pricing.

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COREL™

CORELDRAW GRAPHIC SUITE 12 BUNDLE

COREL PAINTER™ IX



Corel® Painter™ IX - the world's most powerful Natural-Media® painting and illustration software - features unique digital brushes, art materials and textures that mirror the look and feel of their traditional counterparts. The newest version of Corel Painter takes digital design to unprecedented levels with the revolutionary Artists' Oils Painting System, Snap-to-Path Painting, Quick Clone for photographers, and brushes that perform up to ten times faster than previous versions. Corel Painter enables some of the world's most accomplished creative professionals - including commercial designers, artists, and photographers - to extend their natural talents and techniques to create original works of breathtaking digital art.

Q0500 FULL **$649**

UPGRADE / CROSSGRADE
Q0501 **$359⁺**

STUDENT & TEACHER EDITION
Q0502 **$159^**

⁺Full terms and conditions of upgrade/crossgrade are available online at **ht.com.au/cat/corel**

^Proof of valid student status (of the purchaser) must be provided in order to qualify for this pricing.

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Purchase or upgrade to CorelDraw Graphics Suite 12 (excludes stude and teacher edition) and receive a BONUS Corel KnockOut 2 and KPT Collection plug-in#



CORELDRAW GRAPHICS SUITE 12
Ideal for both professional graphic designers and business people, CorelDRAW® Graphics Suite 12 offers a comprehensive graphics solution. Featuring three industry-leading applications - CorelDRAW 12 for illustration and page layout, Corel PHOTO-PAINT® 12 for digital imaging and Corel R.A.V.E.™ 3 for motion graphics creation. This powerful suite delivers incredible ease of use and a wide range of graphics functionality.

COREL KNOCKOUT 2
Hair, smoke, shadows, water, transparencies and any blurred or out-of-focus edges can now be masked with incredible precision, speeding up the entire design process. Plus, Corel KnockOut 2 is an ideal plug-in for Adobe® Photoshop®, Corel PHOTO-PAINT® or Corel® Painter™ 8, so it fits seamlessly into your workflow.

COREL® KPT® COLLECTION
The Corel KPT Collection comb a selection of all the powerful Kai's Power Tools plug-in filter KPT® 5, KPT® 6 and KPT® effec to give professional designers an unprecedented set of creati tools. A natural addition to Adc Photoshop®, it dramatically ext the boundaries of image editin and makes a significant impac your creativity and productivity

#Includes CD media only (excludes manuals).
Available only while stocks last. Offer excludes student and teacher ed

Q3712 FULL VERSION **$64**

Q3711 UPGRADE/CROSSGRADE **$2**



PAINT SHOP PRO 9
- **Photos:** Edit, enhance, and repair with precision tools.
- **Art:** Create masterpieces with realistic painting tools.
- **Graphics:** Design for presentations, print,or the Web.

Q3648 **$219**



PAINT SHOP PRO STUDIO
- **Enhance:** Edit,enhance, and repair with fun tools.
- **Restore:** Restore faded,scratched, and aged photos.
- **Create:** Turn your current photos into masterpieces.
- **Craft:** Make scrapbooks, photo collages, even experiment with home.

R2481 **$159**



PAINT SHOP ALBUM 5
- Find photos in the blink of an
- Improve photos in an instant
- Have fun sharing photos
- Protect photos from computer crashes and viruses
- Includes Bonus PhotoRecove Software, scrapbook template photo paper samples, and mo

R2118 **$**

CROSOFT WINDOWS XP WITH SERVICE PACK 2 NOW AVAILABLE

TRODUCING WINDOWS XP SERVICE PACK 2 WITH ADVANCED CURITY TECHNOLOGIES

ice Packs offer convenient, all-in-one access to the most up-to-date drivers, tools, security enhancements, other critical updates. The latest service pack for Windows XP - Service Pack 2 (SP2) - is all about security provements, and it's one of the most important service packs ever released.

SERVICE PACK 2 BENEFITS INCLUDE:

ke more control with Windows Security Centre - here you can check your Windows Firewall, AV Software d Windows Security updates easily in location.

lp protect your PC with the NEW Windows Firewall - a Firewall helps you to guard against unwanted attacks your PC when you are connected to the internet.

ck distracting pop-ups in Microsoft Internet Explorer - now you have the option to reduce unwanted vertising and content and stop wasted bandwidth by blocking unwanted advertising pop-ups.

achment Manager - helps protect against viruses that can spread through E-Mail, Windows Messenger and rnet Explorer by identifying potentially unsafe attachments.

etooth Hardware Support - Bluetooth is the latest in Wireless technology that enables you to link your PC with latest Bluetooth-enabled wireless devices, including keyboards, mice, printers and mobile phones.

NDOWS XP HOME - TH SERVICE PACK 2 INCLUDED



$40 CASH BACK OFFER* details on page 62

e most dependable Windows operating system

ndows XP sets the standard in efficient computing h a new visual design, the reliable Windows engine, Internet security features.

ndle digital media like a pro

nsferring footage to your computer is faster and ing is easier than ever, with everything you need to ate, edit, and share your home movies.

connected

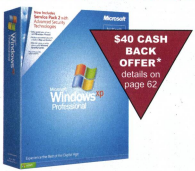
ndows XP has built-in Internet, home networking, real-time voice, video, and instant messaging port. Publish pictures to a Web site or shop online.

Remote Assistance to solve problems

te a friend or support professional to connect to r PC over the Internet to fix a problem or answer a stion.

452	FULL	$309
455	UPGRADE	$155

WINDOWS XP PROFESSIONAL - WITH SERVICE PACK 2 INCLUDED



$40 CASH BACK OFFER* details on page 62

- **Added features**
  The Professional Edition adds security and privacy, advanced recovery options, improved network connections, and more to the features of Home Edition.
- **Superior mobile support**
  Work offline or access your computer remotely with ease with wireless networking support, configuration wizards, improved power management, and more.
- **Greater security**
  Encrypt your files and folders with the highest levels of protection from hackers and data theft, and connect to Virtual Private Networks securely.
- **Integrated and current**
  Integrate with Windows Servers and management solutions and keep your system current with automatic Windows Update.

Q0447	FULL	$440
Q0458	UPGRADE	$315
Q0459	UPGRADE - ACADEMIC#	$125

FOR CURRENT USERS OF WINDOWS XP

If you already own Windows XP, it is strongly recommended by Microsoft to download and install Service Pack 2 (SP2). To do so you can download SP2 or arrange to have it shipped on CDROM.

BROADBAND USERS

Broadband users can download Microsoft Windows XP SP2 (100MB stand alone version). Microsoft has provided SP2 for free download at **www.microsoft.com/australia/windows/sp2**

DIAL-UP USERS

Due to the large file size of the Service Pack, we don't recommend you download it if you are on a dial-up connection. Dial-up users can instead order a Windows XP SP2 CD online.
www.microsoft.com/australia/windows/sp2

ORDERING

If you would rather have Windows XP SP2 delivered to you, see this web address **www.microsoft.com/australia/windows/sp2** to order a CD version of SP2 by mail*
*Shipping and handling costs may apply

WINDOWS XP SP2 - SYSTEM REQUIREMENTS

To install Windows XP SP 2 via CD, you need:

- A PC with Windows XP Home Edition, Professional, Media Center Edition or Tablet PC Edition installed
- 233MHz or higher processor
- 64MB of RAM or higher
- 1.6GB of available hard disk space during installation
- CD-ROM drive

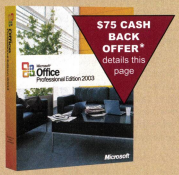
*For non commercial use. Must be a Qualified Education User. For eligibility criteria visit: **http://www.microsoft.com/australia/education/howtobuy/meud/studentsandteachers.aspx**

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Microsoft® Office

LOWER THE COST OF LEARNING

MICROSOFT OFFICE PROFESSIONAL EDITION 2003



Microsoft® Office Professional Edition 2003 can help you and your organisation communicate information with immediacy and impact. New and familiar programs and improved functionality help you build powerful connections between people, information, and business processes.The most complete personal and business productivity solution available from Microsoft. Get everything in Small Business Edition 2003, plus:

- Database creation and management tools, with Microsoft Access.
- Full XML support in Word, Excel, and Access.
- Information Rights Management Technology (IRM).

FULL
L0804 **$829**

UPGRADE
L0805 **$539**

ACADEMIC#
L0803 **$329**

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MICROSOFT OFFICE STANDARD EDITION 20

Reliable, compatible, and easy to use, Microsoft® Office Standard Edition 2003 can help you accomplish your personal tasks with the confidence o working with the industry leader.

- Junk e-mail filtering and blocking of unsafe attachments
- Automatic backup and recovery of documents
- Quick and easy document creation and sharing

L0800 FULL **$665** L0801 UPGRADE **$40**



STUDENT AND TEACHER EDITION 2003

Microsoft® Office Student and Teacher Edition 2003 contains full version of the same applications found in Standard Edition 2003, but value-price specifically for families with students or teachers, and budgets to match. Get everything in Standard Edition 2003, plus installation rights for up to three of your home PCs#.

L0802 FULL **$26**



MICROSOFT OFFICE SMALL BUSINESS EDITION 2003

Microsoft Office Small Business Edition 2003 is a comprehensive suite Microsoft Office tools designed specifically for the needs of businesses like yours. Get everything in Standard Edition 2003, plus:

- More than 20 preformatted business reports
- Easy-to-use wizards to create e-mail newsletters and printed marketin materials

L0826 FULL **$749** L0827 UPGRADE **$45**

TERMS AND CONDITIONS FOR OFFER:

***Microsoft Lower the Cost of Learning Promotion**
Between 1 January 2005 and 31 March 2005 buy any Microsoft: Office 2003 Edition and receive $75 cash back, Office Mac Edi and receive $75 cashback, Office 2003 Application and receive $50 cash back, Windows XP with SP2 Home or Professional an receive $40 cash back, Encarta Premium Suite 2005 and receive $30 cash back.
Please go to www.microsoft.com/australia/office to obtain a copy of the official claim form and further details regarding this promotion. Simply read and fill out the official claim form, sign and date the acceptance of Terms and Conditions stated at the bo of the Claim Form, attach a legible photocopy of your receipt(s) (no handwritten receipts) and send them to: Microsoft Cash Bac PO Box 496, West Ryde NSW 1685. We must receive your claim by 5pm AEST 15/04/05. Once your claim has been received a verified you will be sent your cash back via cheque within 14 days. Any queries please call 1800 233 033 or email us at cashback@promtel.com.au
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For non commercial use. Must be a Qualified Education User. For eligibility criteria visit: http://www.microsoft.com/australia/education/howtobuy/meud/studentsandteachers.aspx

OWER THE COST OF LEARNING



VISIO STANDARD 2003^

Visio Standard 2003 enables users to visualise, document, communicate, and share ideas with attention-grabbing flowcharts, organisation charts, office layouts, and more.

Q9993	FULL	$325	Q9995	UPGRADE	$165
Q9992	ACADEMIC#				$105



VISIO PROFESSIONAL 2003^

Visio Professional 2003 gives IT professionals, engineers, and developers comprehensive technical diagramming and drawing tools to create and share information.

Q9989	FULL	$799	Q9990	UPGRADE	$399
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